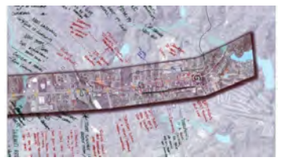


CHAPTER 1 – BACKGROUND AND INTRODUCTION

Introduction

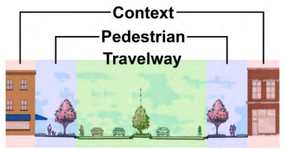
The ***Raeford Road Corridor Study*** was conducted by the Fayetteville Area Metropolitan Planning Organization (FAMPO), in cooperation with the North Carolina Department of Transportation (NCDOT) and the City of Fayetteville. The purpose of the study was to evaluate existing congestion, mobility, safety, and planned development issues along the Raeford Road (US 401 Business) corridor and develop an appropriate transportation strategy that promotes safety and traffic operations while making positive contributions to the vitality of the corridor. The study included intense public involvement, interaction with local stakeholders, development of multimodal transportation improvements, and an action plan for implementing the proposed recommendations and strategies. This report summarizes the methodology, findings, and recommendations of the study. The report is comprised of five distinct chapters, each providing a narrative and graphical summation of the study that culminates in an action plan that outlines the phasing, responsibility, and timing of proposed improvements. The chapters include:



Background and History provides an overview of the project, including goals, objectives, and vision. The public outreach component is described, including stakeholder interaction, community meetings, and the Advisory Committee.

Existing Conditions describes the dynamics that exist along the corridor, including:

- Congestion and Mobility
- Traffic Safety
- Area School Traffic
- Existing Multimodal Options
- Previous Planning Exercises



Best Practices Toolbox presents specific strategies and planning principles that can be applied throughout the corridor and elsewhere in the community.

Corridor Recommendations offers specific corridor recommendations, including congestion and safety countermeasures, a corridor-wide preferred access plan, multimodal improvements, and conceptual design plans for the corridor.

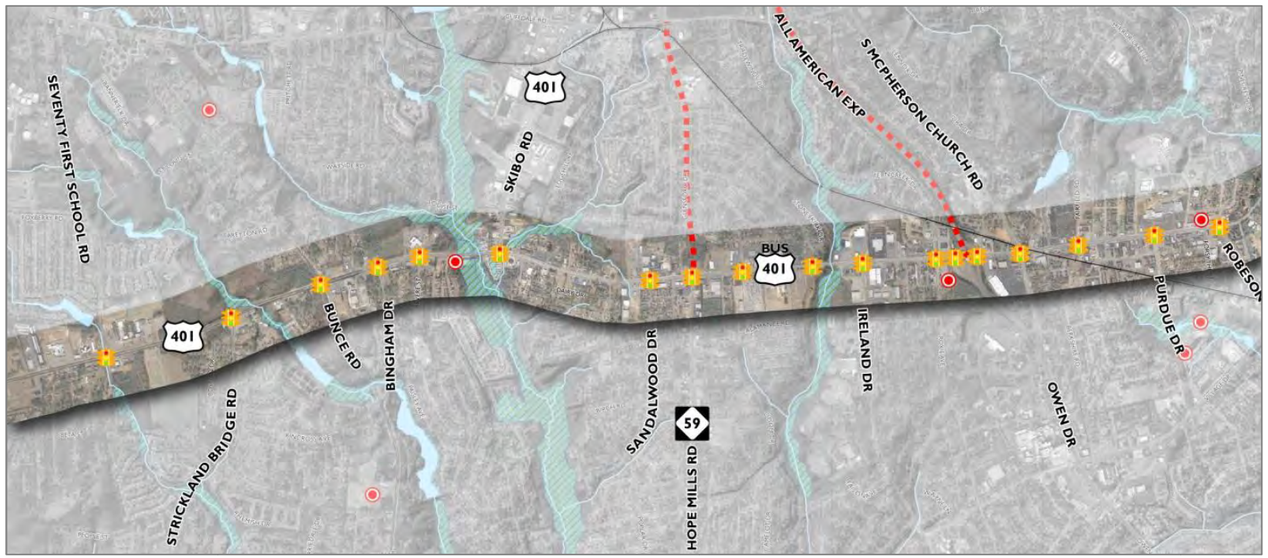
Action Plan provides priorities and phasing, creating a road map for implementing the Raeford Road improvements over the next 15 years.

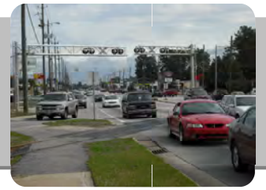
Land Use and Transportation Connection

The Raeford Road corridor is a classic example of the land use and transportation cycle. The corridor has long served as a preferred route to downtown Fayetteville. As residential, commercial and industrial growth occurred and traffic volumes increased, the road was widened to reduce traffic congestion and improve safety. The improvements enhanced access, thus raising land values and attracting more development which led to increased traffic congestion. As shown in the circular diagram to the right, this cycle will continue without deliberate action by decision-makers. The ***Raeford Road Corridor Study*** represents such an action.

Raeford Road Study Area

The extents of the ***Raeford Road Corridor Study*** are Hampton Oaks Drive to the west and Robeson Street to the east. These extents describe the east and west boundaries of the corridor specific improvements, but this study looked beyond those boundaries to incorporate recommendations and strategies related to transit, bicycle, pedestrian, and collector street improvements. Regarding the development review portion of the study, businesses directly adjacent to the corridor were reviewed to determine business type, sustainability, and overall business viability.




Why Study the Raeford Road Corridor?

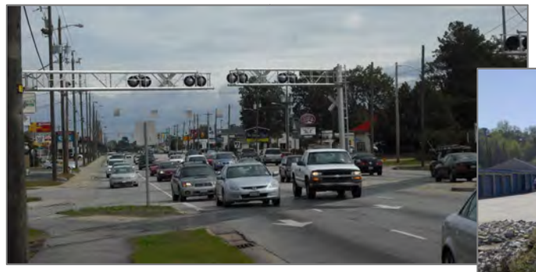
The Raeford Road Corridor serves many sectors of the community, including a large residential population, a healthy commercial presence, more than a dozen schools (including four directly adjacent to the corridor), downtown Fayetteville, the Cape Fear Valley Health System, and commuters from Hoke County and surrounding areas. This is a complex corridor and for this reason, the recommendations developed for this study look beyond the single-dimension transportation improvements common with this type of study.

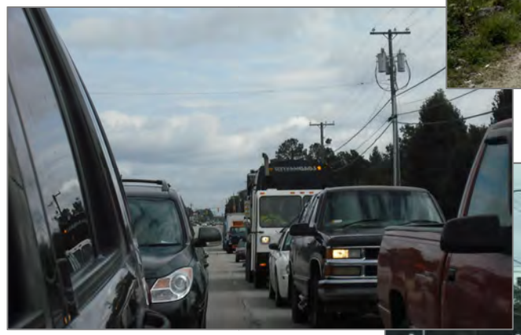
The corridor is among the most dangerous roadways in the community (more than 2,500 crashes in a five-year analysis period) and congestion often is extremely heavy in the morning and evening commute periods as well as during the mid-day rush. However, several positive indicators along the corridor exist, including:

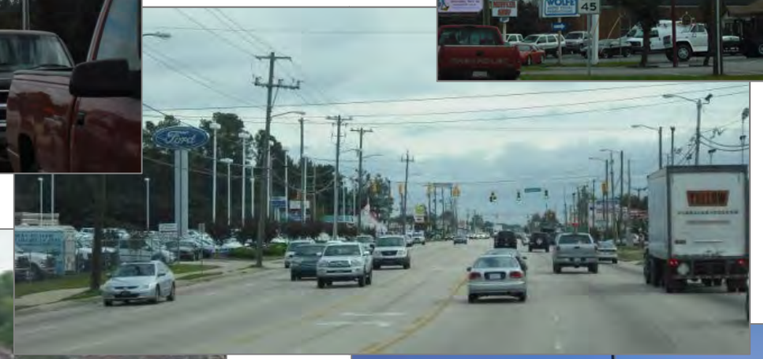
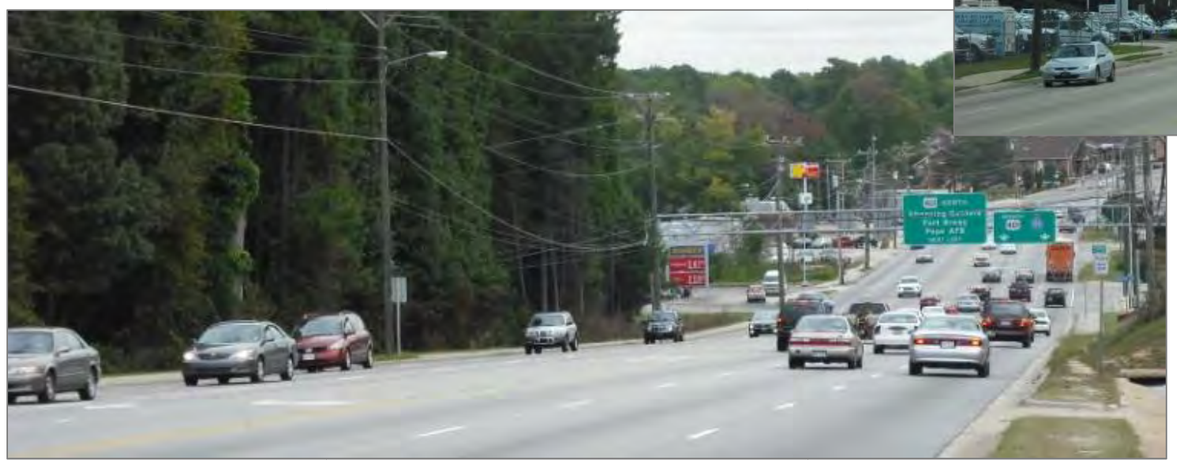
- City traffic engineers have done an excellent job timing signals to respond to prevailing daily traffic conditions.
- Existing businesses are extremely viable (90 to 95% occupancy rates at the time of the study).
- The corridor has been designated by the City as a gateway corridor, with intent to improve aesthetics for this primary entrance into downtown Fayetteville.
- The corridor has been designated as a strategic highway by NCDOT, with the intent to preserve the corridor and enhance traffic safety and operations.

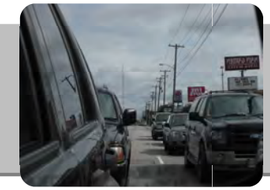
Most importantly, transportation conditions along the corridor have not degraded to the point that commuters, shoppers, and residents no longer choose to travel the roadway. With the help of advance planning the community can take steps to ensure that conditions don't worsen and that future improvements to the roadway consider the diversity of interests that it must serve.

In conducting this study, FAMPO officials, NCDOT staff, and the City of Fayetteville have taken the proactive approach of acknowledging that there is an emerging problem and are responding before its too late. Many communities react to problems that have reached the point that widening the roadway or converting it to an expressway is the only solution. By being proactive, the recommendations for Raeford Road can strengthen the economic vitality of the corridor, manage congestion, and improve safety.





Project Advisory Committee

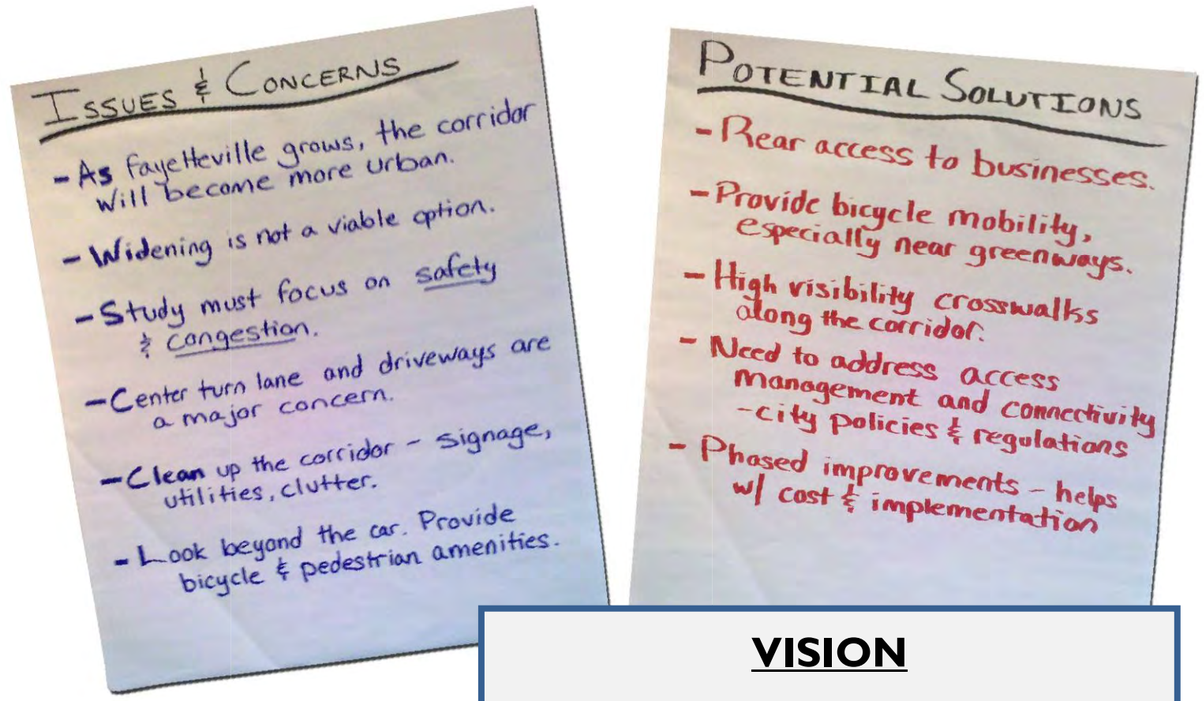
A project advisory committee (AC) was formed to provide technical oversight and assist with the evolution of alternatives and to endorse study recommendations. Beginning with a kickoff meeting February 17, 2010, the AC met throughout the life of the project to discuss existing conditions, identify constraints, develop alternative recommendations, and provide guidance for development of the ultimate improvements and policies. The following sections provide a brief summary of the meetings held throughout the project process.

Meeting 1 – Kickoff

The first AC meeting occurred on February 17, 2010. The general scope of this meeting was to discuss the approach to the project, identify roles, and establish goals and objectives. Several up-front issues and guidelines were identified, including the desire to keep improvements inside the existing travelway, the desire to focus improvements on access management and aesthetic improvements, and the need to address multiple modes of travel.

An "Issues Identification" exercise allowed for the identification of problem areas along the corridor as well as opportunities or improvements. The results of this exercise are shown on the following page. The meeting closed with a discussion of upcoming public outreach efforts and the need to involve specific stakeholders along the corridor.

Members of the AC reviewing mapping and identifying issues and constraints along the corridor

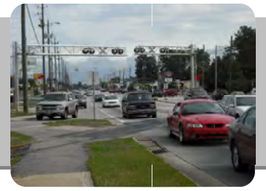


Goals and Objectives

- Reduce frequency/severity of crashes
- Promote mobility/congestion reduction
- Protect/promote business
- Enhance pedestrian/bicycle and transit mobility
- Identify phased improvements (interim & long-term)
- Identify funding strategies tied to specific recommendations
- Facilitate access/connectivity policies
- Implement improvements in cooperation with future development/redevelopment opportunities.

VISION

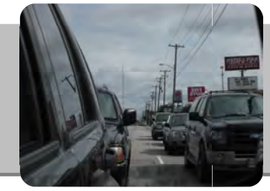
To create a Plan that enhances the safety, mobility, and appearance of the Raeford Road corridor, in a manner that promotes quality development and economic vitality.


Issues Identification Map Advisory Committee Kickoff Meeting (February 17, 2010)

Issues Identified:

- Critical areas of need for access management
- Issues related to access and development near Skibo Road
- Issues related to Aberdeen-Rockfish Rail Crossing
- Areas for potential development
- Future roadway improvements
- Pedestrian crossing issues near 71st School Road
- Context Zones for phasing recommendations



Meeting 2 – Existing Conditions Evaluation

The second AC meeting occurred on March 31, 2010 prior to the first public workshop. At this meeting, the committee expanded upon the issues and themes discussed at the first meeting and established the foundation for the workshop that occurred in the evening. A key part of the meeting was the review of the existing conditions analysis and gathering feedback from the committee on the validity of the collected data. This process allowed persons with direct knowledge of the corridor to look beyond the numbers and provide a deeper understanding of existing conditions. With this understanding, the project team moved forward with soliciting feedback from the public and developing multimodal recommendations.

Meeting 3 – Alternatives Work Session

The third AC meeting occurred on April 22, 2010. The initial focus of this session was to review comments from Public Workshop #1 and evaluate a series of multimodal improvement strategies. The analysis of existing conditions and review of public feedback provided the foundation for the development of the preferred access plan, which established the preferred location and spacing of proposed traffic signals and median openings. Next steps were discussed, including the analysis of recommendations, the creation of the conceptual design, and ways to gain buy-in from stakeholders and local decision makers.

Meeting 4 – Alternatives Refinement

The fourth meeting occurred June 14, 2010 as a final opportunity to refine the study recommendations prior to gathering feedback from the public. The project team explained the details of the conceptual drawings and received valuable insight on access issues and improvements to specific intersections along the corridor. The meeting closed by discussing the logistics of Public Workshop #2, including ways to ensure both feedback and buy-in from the public at-large. The final public workshop occurred the following week.

Public Involvement

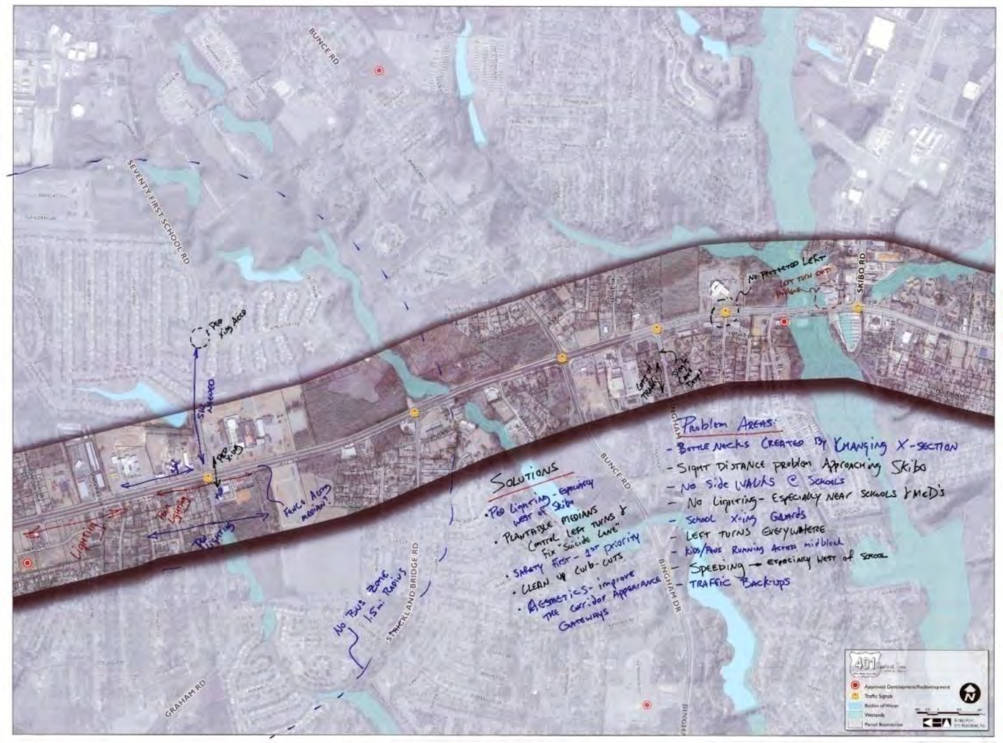
The project team and AC felt it was important to engage the public throughout the planning process. Initial public involvement efforts focused on providing the community an opportunity to identify frustrations, voice concerns about the study, and provide opinions related to potential improvements. Follow-up efforts focused on providing the community and opportunity to review recommendations and designs, verifying that the issues and concerns identified in the initial phases were addressed and implemented in the final recommendations. This inclusive process provides greater opportunity for public buy-in, as concerned citizens are involved from the beginning of the process (including development of alternatives), rather than after recommendations are finalized.

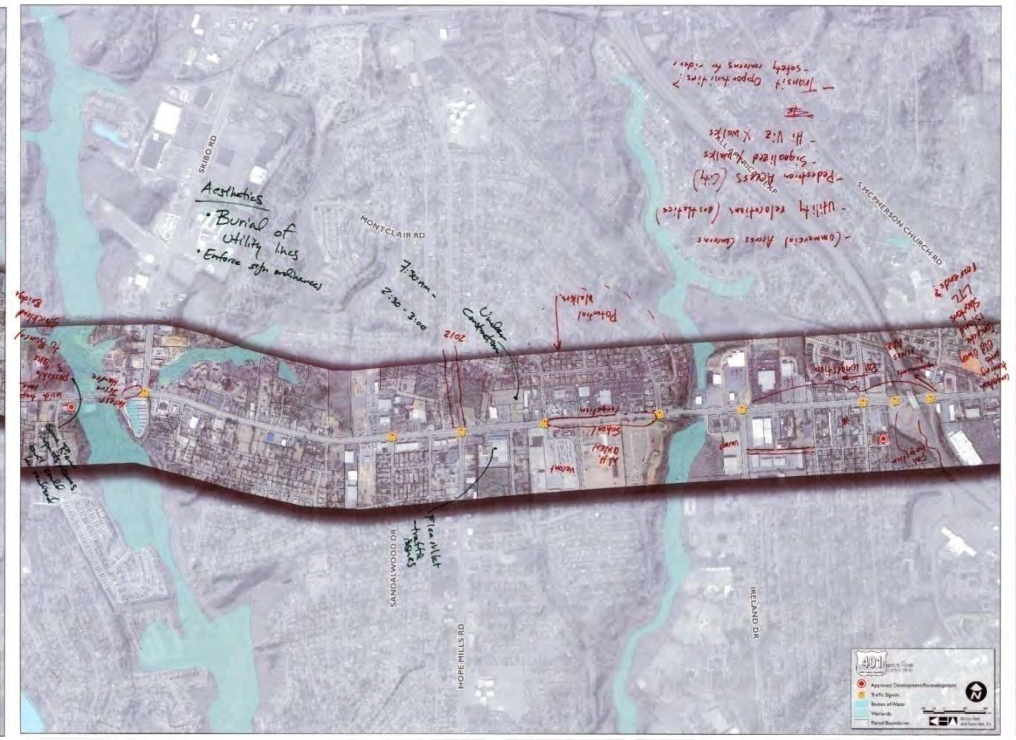
The Raeford Road Corridor Study had four unique public outreach events, including a public survey, a stakeholder symposium, and two public workshops. These efforts are described in the following sections.

Stakeholder Symposium

The first major public outreach effort of the Raeford Road Corridor Study was the Stakeholder Symposium, held on March 15, 2010. The event provided an opportunity for key stakeholders to learn more about the project approach prior to major work efforts commencing. Twenty-five people attended, including business owners, developers, local planners, NCDOT officials, local elected officials, and public safety officers. The event consisted of three main components — education on existing conditions, a visioning exercise, and a case study on the effects of poor planning and transportation decisions. Results from the vision exercise are shown in the maps on the following page.

Scenes from Project Stakeholder Symposium, including intro by City Manager Dale Iman and visioning exercise





CONTEXT AREA 1: ***Hampton Oaks Drive to Skibo Road***

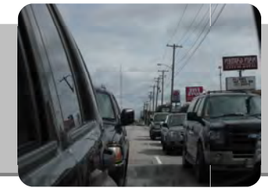
- Problem Areas:
  - Bottle necks created by changing cross section
  - Sight distance problem approaching Skibo Road
  - Lack of sidewalks at schools
  - Lack of lighting, especially near the schools and McDonald's
  - Unpredictable left-turn movements
  - Pedestrians crossing at midblock
  - Speeding, especially west of the school
  - Congestion
- Solutions:
  - Pedestrian lighting along Raeford Road near the schools
  - Sidewalks on 71st School Road and Raeford Road
  - Enhanced pedestrian crossing of Raeford at 71st School Road
  - Plantable medians to control left turns
  - Fence in median to direct pedestrians to the intersection
  - Cleaned up curb-cuts
  - Landscaping and other aesthetic improvements

CONTEXT AREA 2: ***Skibo Road to All American Expressway***

- Problem Areas:
  - Traffic issue hot spots: at Owen Elementary School, near flea market, access at Hardees (Skibo Road).
  - Access to commercial areas
  - Pedestrian access and safety
  - Lack of transit
- Solutions:
  - Bury utility lines
  - Enforce sign ordinance
  - Pedestrian signals and high visibility crosswalks

CONTEXT AREA 3: ***All American Expressway to Robeson Street***

- Problem Areas:
  - Access to businesses
  - Speeding traffic
  - Dangerous intersections, especially Ravenhill Drive and Executive Place
  - Unsafe pedestrian crossings
  - Lack of protected left turns for buses
  - Left turns from Robeson Street to Raeford Road
  - Impact of trains (disrupts signal timing)
  - Cut through traffic
- Solutions:
  - Landscaping and other aesthetic improvements
  - Pedestrian signals and high visibility crosswalks
  - Sidewalks for school



Public Survey

The Raeford Road public survey was developed to better understand the perception of existing conditions along the corridor as well as the overall feeling toward specific improvements and funding. The survey was distributed at all of the public outreach events and online through the FAMPO website and mass email distribution. In total, nearly 300 surveys were completed, providing a strong foundation for the development of recommendations and strategies.

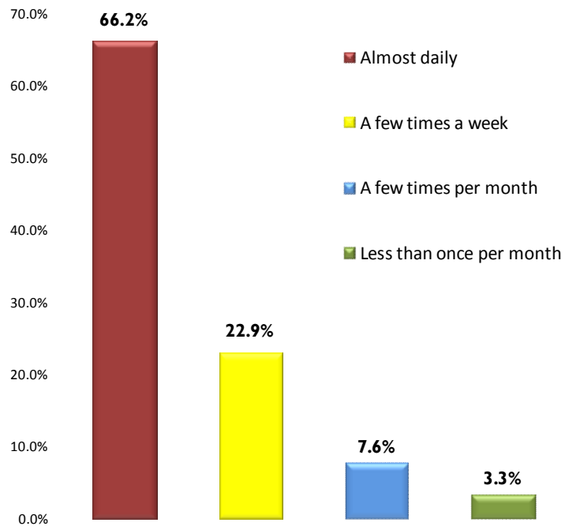
Demographic questions help not only to understand who is completing the survey but also to understand who is participating in the overall planning process. These questions revealed the following:

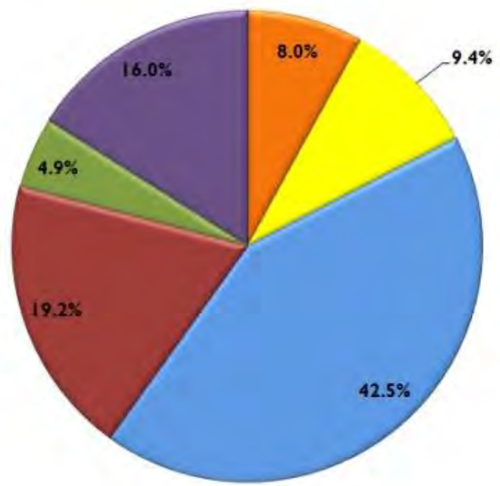
- 54.8% describe their relationship to the Raeford Road Corridor as a permanent resident
- 30.2% describe their relationship to the Raeford Road Corridor as an employee in the city or county
- 8.8% describe their relationship to the Raeford Road Corridor as a frequent visitor
- 68.7% have lived in the area more than 10 years
- 12.4% have lived in the area 1 to 5 years
- 8.0% do not reside in the area


Public Questionnaire

The graphs on the following page illustrate some of the trends as expressed through the public survey.

How often do you drive on Raeford Road?

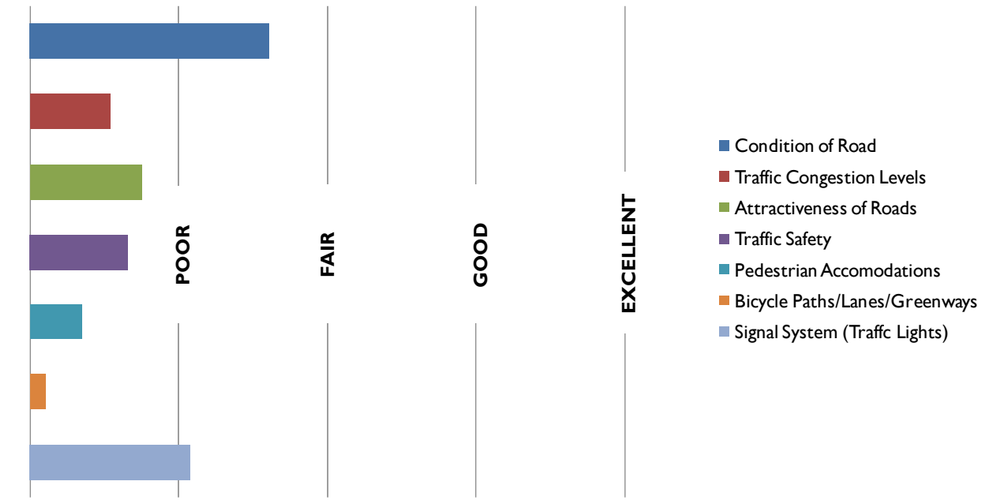


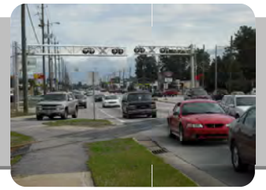


What time of day do you most travel in the Raeford Road corridor?

- Morning Rush Hour
- Evening Rush Hour
- Both Morning and Evening Rush Hour
- Middle of the Day
- Other times
- On the Weekend

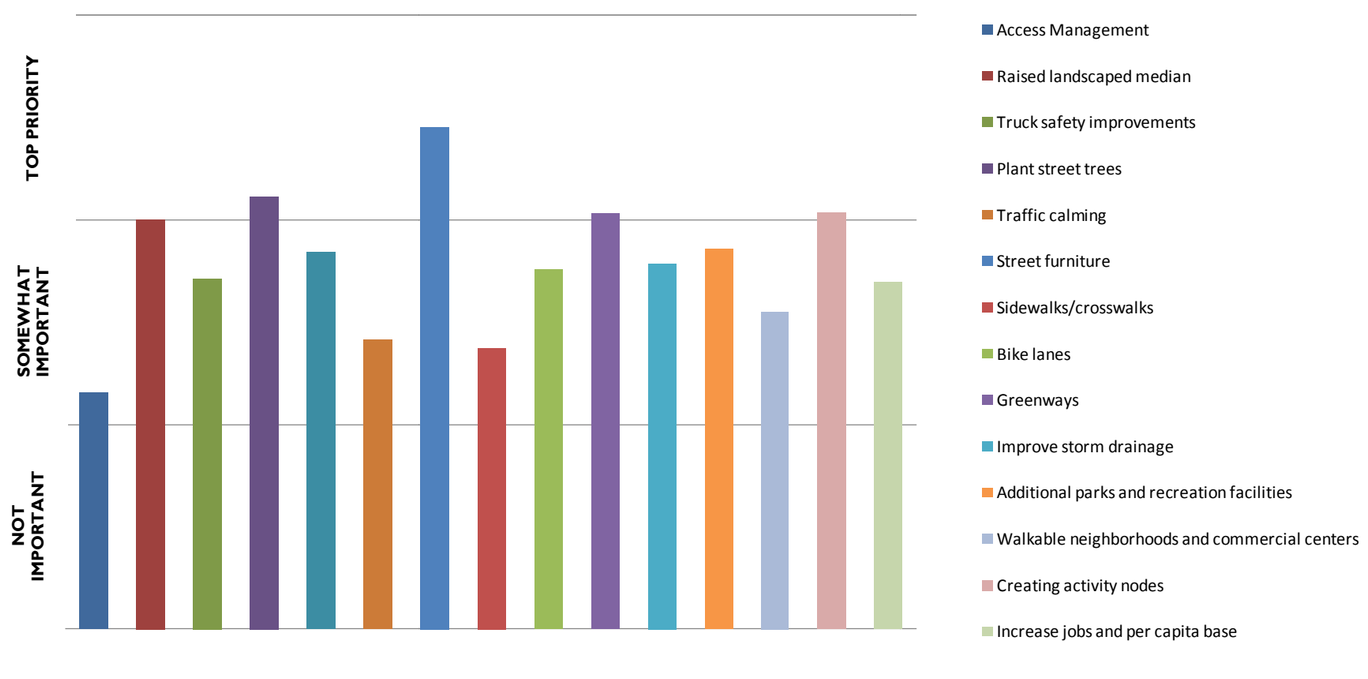
Overall, how do you rate conditions within the Raeford Road Corridor?

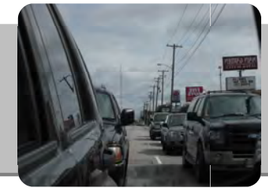


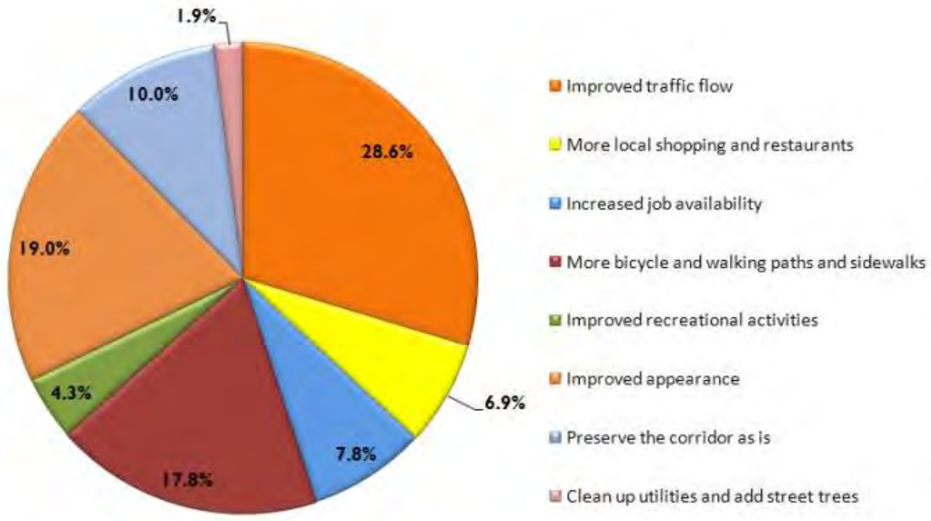

What type of development is desired along the corridor?

How important are the following improvements to addressing concerns in the Raeford Road corridor?

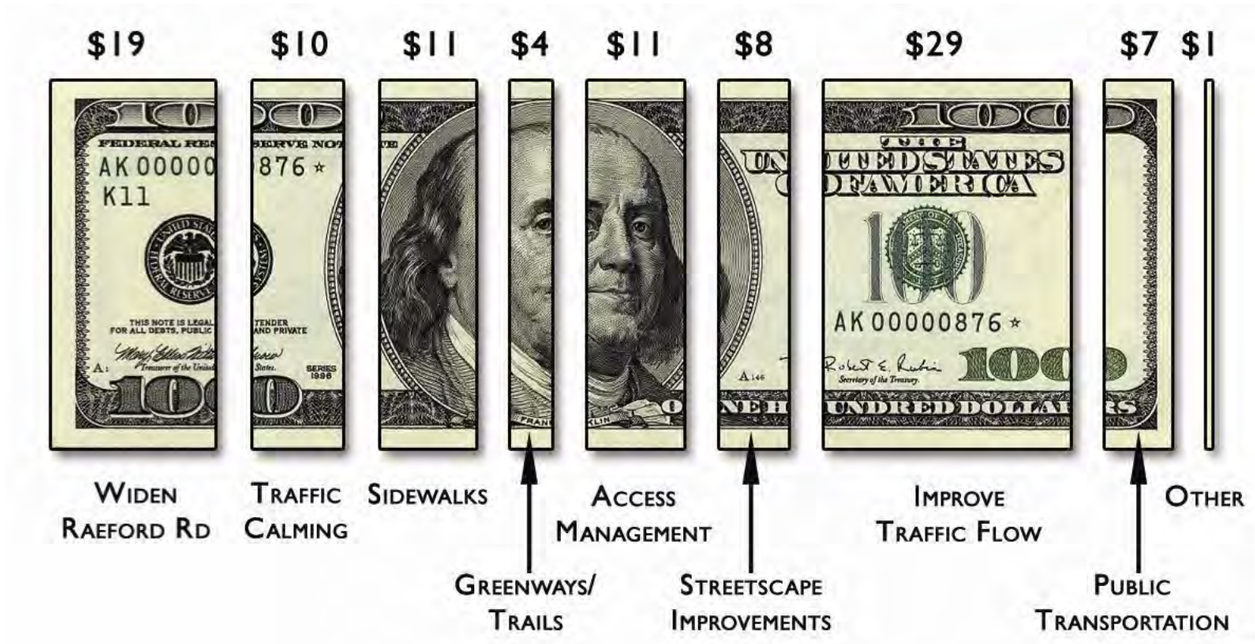


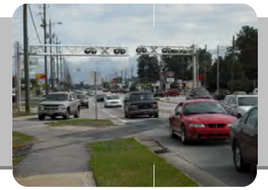


By the year 2020, what changes would you most like to see along the Raeford Road corridor?



How would you spend your money on improvements for the corridor?

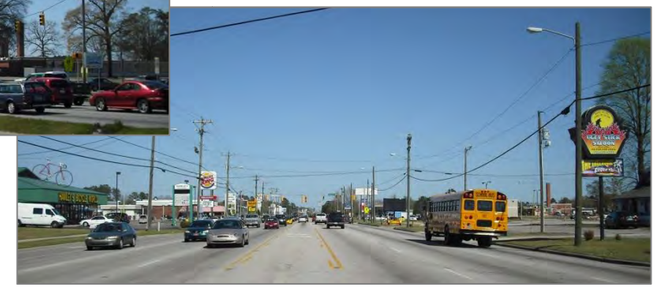



Stakeholder Interviews

With well-designed meetings and multiple opportunities for interaction, the Advisory Committee and general public provided good insight into the planning issues facing the Fayetteville community. However, for specific matters affecting the development and implementation of the study recommendations, key stakeholders had to be targeted. Stakeholder interviews were conducted March 31, 2010, during which members of the project team met with four different stakeholder representatives to understand their perception of existing conditions along the corridor and reaction to potential types of recommendations. The meetings encouraged the stakeholders to provide comments and recommendations of their own. The stakeholder groups represented local businesses, school administration, local police, and the transit service.

Conversations with these stakeholders provided insight into a variety of issues spanning the operational, safety, aesthetic, economic, and social issues facing the corridor now and in the future. Feedback gathered through these conversations helped validate background information and the results of other public outreach efforts. The information also helped the project team prepare a list of initial recommendations. Some of the comments included:

Local Businesses

- Both traffic and safety are problems.
- Peak hours are congested, but the corridor is still busy at 10:00 p.m.
- Growth over the last 10 years has been very noticeable.
- Sight distance is a concern at Strickland Bridge Road and Bingham Drive.
- Flashing yellow lights can be confusing.
- Medians can be effective but median openings have to be properly spaced and designed.
- Medians may be more harm to family-owned businesses on smaller parcels.
- Many long-term, established businesses depend on the corridor's traffic.
- Signal timing is an issue.

Schools

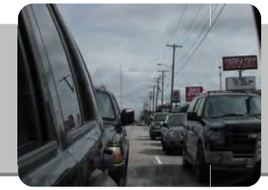
- Bus and parent access is an issue at Auman Elementary School.
- Street lighting is needed at intersections from Skibo Road to the high school. Lighting is needed for the portion of the corridor that fronts the elementary and high schools.
- Access to adjacent signal from William H. Owen Elementary School is needed.
- Median islands should be used to help control left turns.

Local Police

- Rear end accidents are a problem.
- A lack of neighborhood connectivity contributes to safety and congestion problems.
- Medians would be a big improvement but access to businesses must be protected.

Transit Service

- Lanes need to be wide enough for buses.
- Bus routes need to be on main roads.
- Rerouting buses can only occur if money is available to fund it. Transit recommendations as part of the plan could help secure funding.
- Bus pullouts are needed, preferably after the intersection. Locations for consideration should include Robeson Street or Executive Drive, Purdue Drive, Tallywood Shopping Center, McPherson Church Road/Owen Drive, and near Big Lots.



Public Workshops

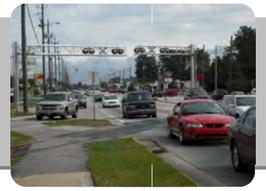
Citizens interact with the transportation system in a variety of ways. This statement rings truer on corridors such as Raeford Road that must balance regional mobility with local access. Given the unique way individuals interact with the Raeford Road corridor, local citizens understand the strengths and weaknesses of the transportation system and feel the impact of transportation decisions on a daily basis. A well-publicized and properly designed outreach effort allows local planners and the project team to tap into this special knowledge. The planning process for the Raeford Road Corridor Study included two workshops, each of which had specific objectives.

Public Outreach #1 — Visioning

The first public workshop, held March 31, 2010 at William H. Owen Elementary School, was structured to engage participants in the identification of issues and to generate ideas and potential solutions for a preferred vision. The evening began with an overview presentation during which the project team outlined the planning process, introduced background information, and set the stage for the interactive sessions that formed the core of the workshop. Following the presentation, those in attendance expressed concerns and needs in a large group setting. Comments from this part of the evening were transcribed on large easel boards. Attendees then gathered in small groups around maps to discuss the opportunities and needs at specific points along the corridor. Approximately 75 individuals attended the workshop.

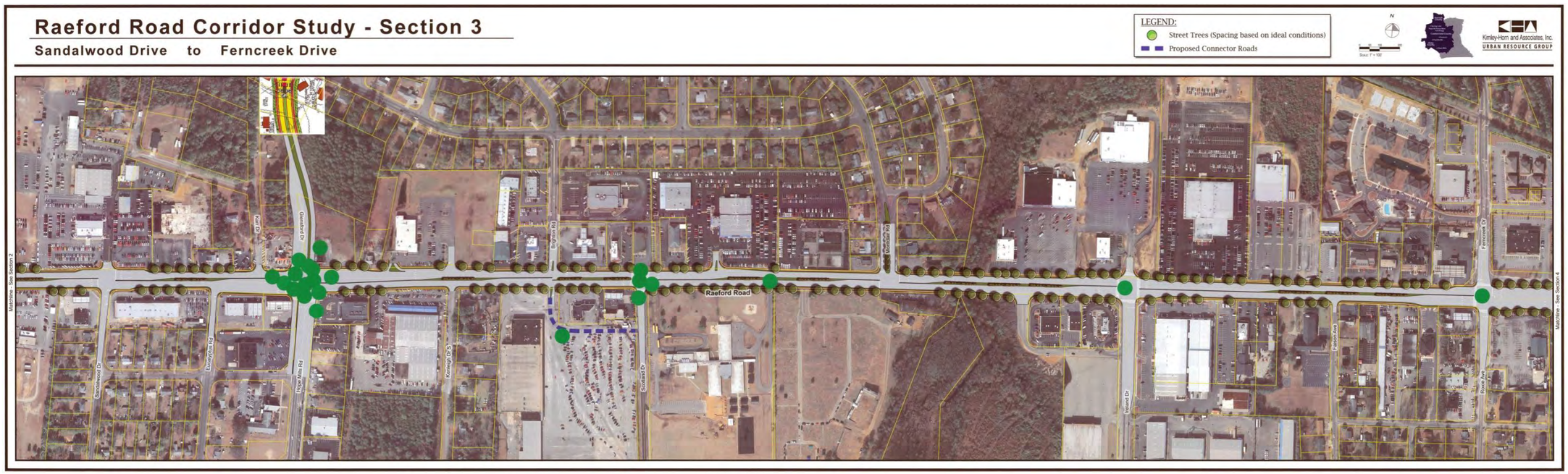
The mapping exercise was the focus of the meeting and allowed attendees not only to vocalize their concerns but also to recommend specific improvements. At the end of the evening's events, each group presented their findings to the entire audience. Comments received during the first round of workshops were considered throughout the planning process especially when developing potential recommendations for facilities, programs, and policies.

Scenes from Public Workshop #1


Public Outreach #2 — Feedback

Comments received during the first workshop and other public outreach channels formed the basis of the study results. Prior to submitting the draft recommendations, the project team assembled with the public at 71st High School where a second public workshop was conducted. The workshop was held on June 22, 2010 with approximately 40 people present. At this workshop, the public viewed recommendations and strategies in an informal setting. Attendees viewed maps, provided comments, and voiced their support for specific recommendations by placing dots on maps as an expression of their support for various transportation strategies. Maps available at the workshop showed the preferred access plan, bicycle and pedestrian improvements, transit recommendations, collector streets, and a conceptual design of Raeford Road that illustrated the median location, median openings, intersection improvements, and laneage. Generally, most of the recommendations received public support with the exception of a few locations where the additional feedback generated additional ideas. The inclusive public outreach strategy resulted in the public taking part in the creation of solutions, evaluation of alternatives, and endorsement of a preferred vision.

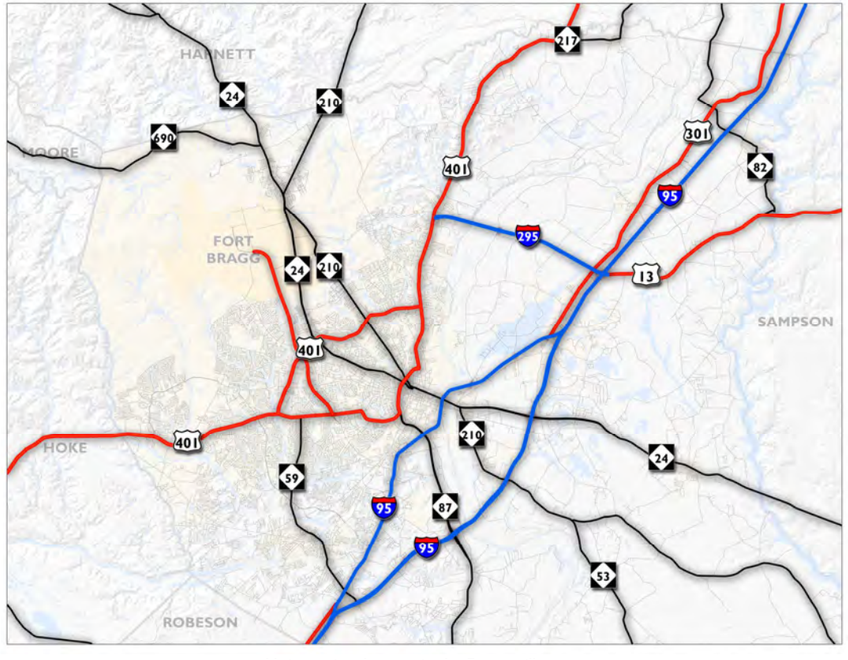




CHAPTER 2 – EXISTING CONDITIONS

Raeford Road currently serves multiple purposes within the Fayetteville community, including:

- ***First***, the roadway is a commuter corridor. As the only major east-west corridor between Hoke County and Fayetteville, the facility carries upwards of 50,000 vehicles per day primarily in the peak hours and is one of the most highly traveled corridors in the Fayetteville area.
- ***Second***, the roadway is a major commercial corridor within the heart of Fayetteville, including a mixture of car dealerships, office parks, "Big Box" chain businesses, and smaller local businesses.
- ***Third***, the corridor is in the heart of the education system for the City of Fayetteville and Cumberland County. With fourteen schools located along or within a mile of the corridor, Raeford Road is a primary artery for the community's school transportation efforts.
- ***Fourth***, and finally, the corridor is a gateway into the Fayetteville community. With the number of people using the corridor as their primary access point into Fayetteville, the roadway and surrounding environment is the first impression visitors get of the community.



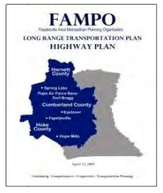
Major regional routes in the Fayetteville area

The ***Raeford Road Corridor Study*** primarily is driven by congestion and safety concerns. Within the past ten years, traffic volumes have grown by as much as 10,000 vehicles per day along the corridor. The increased traffic volumes creates congestion issues that, when coupled with the numerous driveway openings along the corridor, amplify mobility constraints. Traffic safety issues give additional weight to the need for action. In the past five years, nearly 2,500 crashes have occurred along the corridor. This number of crashes produces a crash rate nearly double the state average for a similarly sized corridor. With these mounting congestion and safety concerns, it is apparent that something must be done to increase safety and mobility along the corridor.

At the same time, project planners and engineers must recognize that transportation improvements have to be complimentary to the surrounding roadway environment. Transportation planning cannot exist in a vacuum and must consider the impacts to adjacent land uses and alternative modes of travel. The Raeford Road corridor – one of the primary commercial corridors in the Fayetteville community – contains development of all shapes and sizes. Even more important, the development along the corridor is highly sustainable – at the time of this report no more than five to ten percent of development along the corridor was vacant. The recommendations from this study recognize that the continued success of the businesses along the corridor is as important as correcting existing safety and congestion problems.

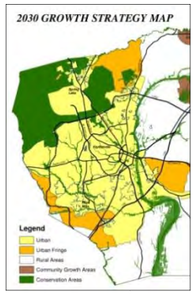
This chapter focuses on defining the existing conditions along the corridor, for both transportation and development conditions. Three distinct sections within this chapter define the following:

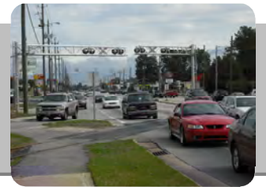
- **Previous Planning Efforts** – a brief description of previous plans and studies whose recommendations impact the ***Raeford Road Corridor Study***.



- **Existing Traffic and Crash Conditions** – a tabular and graphic description of vehicular operations and traffic safety along the corridor today.

- **Business Profile** – an overview of the pass-by and destination business clusters and a summary of the business questionnaire.




Existing Plans and Committed Projects

The existing conditions analysis began with a review of previous planning efforts as well as an evaluation of how committed projects and improvements might affect existing and future conditions. The following sections provide brief descriptions of the studies and projects analyzed.

Raeford Road (US 401 Business) Feasibility Study (2000)

In 2000, NCDOT Division 6 conducted a feasibility study for safety and operation improvements along Raeford Road (US 401 Business) from Skibo Road (US 401) to All American Expressway. The study was requested by FAMPO to consider additional widening along the corridor between Skibo Road and Ireland Drive – however NCDOT extended the project extents to All American Expressway. The City of Fayetteville, in an effort to minimize additional widening, asked the study team to limit widening to intersection locations only. The study identified three slightly different alternatives:

- **Alternate 1** – localized intersection improvements to both Hope Mills Road (NC 59) and Ireland Drive (see figures below). Estimated cost was $7,500,000.

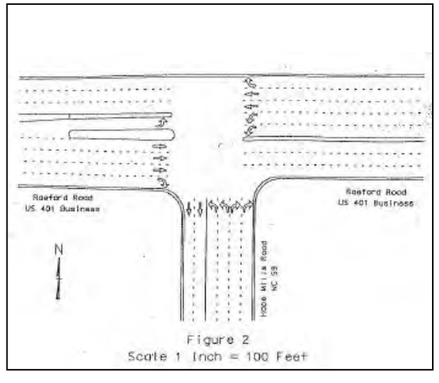


Figure 2
Scale 1 Inch = 100 Feet

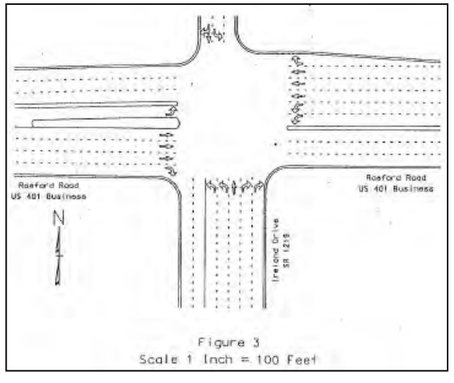


Figure 3
Scale 1 Inch = 100 Feet

- **Alternate 2** – widen Raeford Road from Skibo Road to Ireland Drive (1.78 miles); six lane divided cross section with16 foot median and 10 foot berms (120 feet total right-of-way). Estimated cost was $16,700,000.
- **Alternate 3 (Preferred Alternative)** – widen Raeford Road from Skibo Road to All American Expressway (2.0 miles); six lane divided cross section with16 foot median and 10 foot berms (120 feet total right-of-way). Estimated cost was $17,900,000.

FAMPO 2035 Long Range Transportation Plan Update

As part of the ongoing transportation planning process in the City of Fayetteville and Cumberland County, FAMPO updates a Long Range Transportation Plan (LRTP) every five years. The latest update occurred in 2009 and includes recommendations not only for roadway improvements but also bicycle and pedestrian amenities, aviation, congestion management, transit, freight, rail, and safety. The following section describes some of the LRTP elements that influence the planning process along Raeford Road.

Highway Plan

The highway plan provided improvements based on existing deficiencies and projected growth. It provides the core recommendations of the entire long range transportation planning process. The proposed improvements are grouped into one of three categories.

- **Priority One** – roads in immediate need for improvement. These projects typically are grouped with dedicated funding and can be found in the yearly Metropolitan Transportation Improvement Program (MTIP)
- **Priority Two** – roads currently close to exceeding their capacity
- **Priority Three** – roads projected to reach their capacity by the 2035 horizon year

The section of Raeford Road between Skibo Road and All American Expressway is listed as a Priority One project scheduled for widening to multi-lanes (this improvement corresponds with the recommendations from the previous feasibility study) and is found on the fiscally restrained list of LRTP projects. **Table 2.1** provides all of the recommended projects within the Raeford Road corridor study area.

Table 2.1 – FAMPO Highway Plan Priority Improvements

Priority One Projects		
Project #	Description	Improvement
U-4405	Raeford Road (US 401), Skibo Road to All American Expressway	Additional lane in each direction
U-2811	Ireland Drive (SR 1219), Cumberland Road to Raeford Road	Widen to multi-lanes
U-3424	Bunce Road (SR 1410-SR 1411), US 401 to Cliffdale Road	Widen to multi-lanes
U-4414	All American Expressway (SR 1007), Owen Drive to Santa Fe Drive	Additional lane in each direction
U-4422	Glensford Road (SR 1596), Raeford Road to Cliffdale Road	Widen to five lanes, part on new location
Priority Two Projects		
Project #	Description	Improvement
--	Strickland Bridge Road	Widen to multi-lane facility and relocate
--	NC 59 (Hope Mills Road), Raeford Road to Camden Road	Widen to multi-lane facility (6-lane div.)
--	Robeson Street, Raeford Road to Rankin Street	Widen to multi-lane facility (6-lane div.)

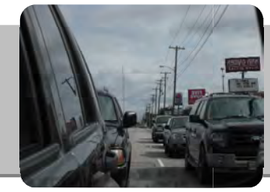
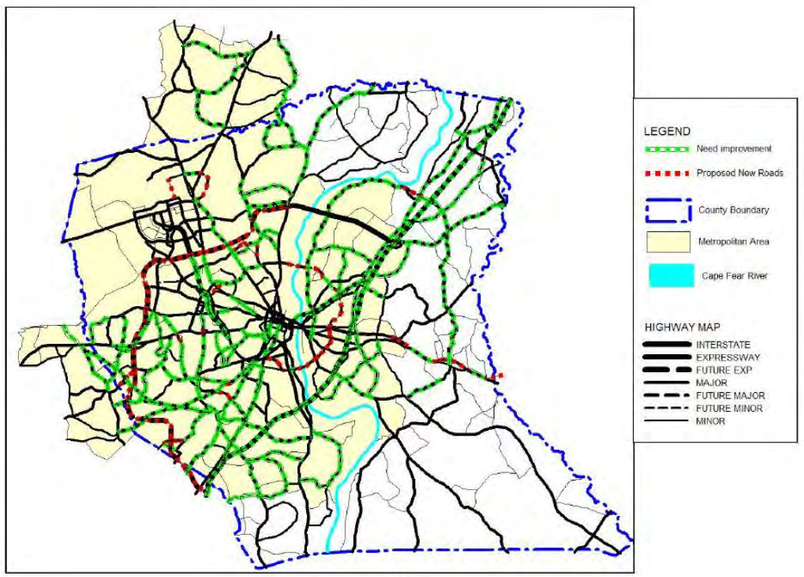


Table 2.1 – FAMPO Highway Plan Priority Improvements (continued)		
Priority Three Projects		
Project #	Description	Improvement
--	Graham Road	Widen to multi-lane facility (4-lane div.)
--	US 401 – S. Raeford Road	Widen to multi-lane facility (6-lane div.)
--	All American Expressway	Widen to multi-lane facility (6-lane div.)
--	Ireland Drive	Widen to multi-lane facility (4-lane div.)
--	Seventy First School Road	Widen to multi-lane facility (4-lane div.)



2035 Proposed Projects List (FAMPO LRTP)

Bicycle and Pedestrian Plan

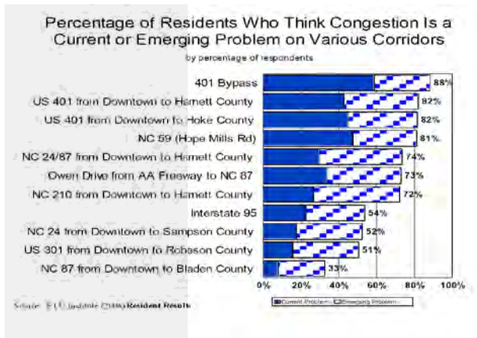
The Bicycle and Pedestrian element of the FAMPO LRTP provides direction and recommendations to improve and expand the walking and cycling network throughout the Fayetteville area. The plan recommends more than 140 miles of bikeway facilities throughout the Fayetteville community. In the plan, Raeford Road is designated as an experienced rider's route with proposed bicycle facilities, although the specific types of improvements are not defined. Between Skibo Road and Cliffdale Road, the corridor is designated as part of Route 1 for inclusion in the statewide transportation improvement plan.

Congestion Management Plan

The Congestion Management Plan (CMP) element of the FAMPO LRTP provides guidance for managing congestion and improving corridor operations throughout the Fayetteville community. The plan outlines strategies and measures of effectiveness for the following areas:

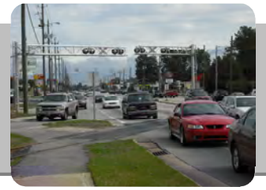
- Roadway and development accessibility
- Maintaining traffic safety
- Reducing environmental impacts from transportation
- Reducing congestion
- Improving freight mobility
- Improving alternative transportation usage

The CMP provides a list of the most congested corridors in the community. Raeford Road ranks third on the top ten list of congested corridors, trailing only McArthur Road and Santa Fe Drive. The plan also conducted a formal survey of Fayetteville area residents to determine public opinion related to the most congested corridors. Raeford Road ranks third on the 2008 FAMPO LRTP Survey with 82% of respondents indicating the corridor (from downtown to Hoke County) has a problem or an emerging problem.



The CMP also provides preferred strategies for relieving congestion, including:

- Roadway widening
- Intersection improvements
- Vertical/horizontal alignment improvements
- One-way operation
- Signal and phasing coordination
- Alternate modes of transport
- Land use planning
- Eliminate roadside obstacles
- Control access
- Remove parking
- Use of reversible lanes
- Carpooling
- Alternate work hours


Rail Plan

The Rail component of the FAMPO LRTP provides guidance and recommendations for rail and freight movement. The plan identifies existing rail lines and provides general recommendations to improve the rail and freight system. The primary rail line impacting the Raeford Road corridor is the Aberdeen Rockfish Railroad, with a crossing near the South McPherson Church Road intersection with Raeford Road. The railroad potentially could further impact congestion based on the advanced operations of the ethanol plant in Raeford. In general, no specific rail recommendations impact Raeford Road or the existing rail crossing.

Safety Plan

Safety component is a new piece of the long range planning process that addresses both safety and security of the Fayetteville area transportation system. The FAMPO LRTP finds safety is improving in the City of Fayetteville and Cumberland County. Between 2006 and 2007, Fayetteville went from 1st to 5th among North Carolina cities with 10,000 or more people and Cumberland went from 19th to 24th among North Carolina counties in terms of the number of fatal and serious injury crashes.

The FAMPO LRTP Safety component follows the NCDOT State Highway Safety Improvement Plan goals and objectives, which generally include (1) establishing highway safety goals/objectives and priorities and (2) implementing and evaluating coordinated, multi-disciplinary policies and programs to reduce fatalities, injuries and economic losses related to crashes. The original quantifiable goal was to reduce the fatality rate to 1.0 fatalities/100 MVM (million vehicle miles) by 2008. Currently, the revised goal is to reduce annual fatality rates by 2.5% per year for the next 20 years

Additionally, the Safety component provides key facts and statistics from the NCDOT Traffic and Safety Systems Unit, including cost per crash and typical crash reduction factors. The most recent crash cost statistics include:

- Fatality = $4,400,000
- A injury crash = $250,000
- B injury crash = $74,000
- C injury crash = $36,000
- Property damage only = $5,000
- Average crash cost = $49,000

The Safety component also mentions the NCDOT Hazard Elimination Program, which provides a prioritization list for potential safety projects. The ranking system allows for a cost effective measure for selecting spot safety projects and implementing achievable solutions. Purdue Drive, Brighten Road, Ireland Drive, Cambridge Street, Executive Drive, and Scotland Drive are all listed as potential intersection locations along Raeford Road.

FAMPO Transportation Improvement Program (2009-2015)

The FAMPO Transportation Improvement Program lists projects for inclusion on the NCDOT TIP master list. **Table 2.2** provides the projects identified as part of the 2009-2015 TIP list.

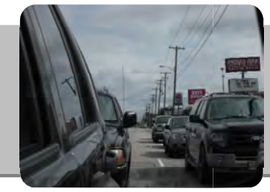
Table 2.2 – FAMPO Transportation Improvement Program (2009-2015) Projects

TIP Number	Roadway	Section	Improvement	Funding
U-4405	Raeford Road	Skibo Road to Ireland Drive	Widen to multi-lanes	Funding identified in post years (Right-of-Way = $2,200,000; Construction = $3,600,000)
U-4414	All American Freeway	Owen Drive to Santa Fe Drive	Widen additional lane in each direction	Right-of-Way and Mitigation in 2011 ($2,810,000), Construction 2012-14 ($31,400,000)
U-2811	Ireland Drive	Raeford Road to Fisher Road	Widen to multi-lanes	Funding identified in post years (Right-of-Way = $2,900,000; Construction = $7,800,000)
U-4422	Glensford Drive (and Glensford Drive Extension)	Raeford Road to Cliffdale Road	Widen to five lanes, with part on new location	Right-of-Way in 2009 ($4,460,000), Construction in 2010-12 ($6,050,000)
U-3424	Bunce Road	Raeford Road to Cliffdale Road	Widen to multi-lanes	Funding identified in post years (Right-of-Way = $2,035,000; Construction = $4,550,000)
U-3311	Bingham Drive	Fisher Road to Raeford Road	Realignment	Complete

Transit Development Plan

The City of Fayetteville Transit Development Plan identifies the expansion or modification of the existing transit system to accommodate the City of Fayetteville, including newly annexed areas. Recommendations include restructured routes, time changes, and infrastructure improvements.

Generally, Raeford Road is served by Routes 15 and 7, with periphery route support from Routes 8 and 16. At the time of the Transit Development Plan, the entire system had approximately 58,000 revenue hours, 750,000 revenue miles, 2,800 passenger trips/day, and a $4.38 cost per passenger trip. The highest productivity routes were routes 6, 5, and 14. The lowest productivity routes were routes 16, 17, and 15. The study also conducted extensive public outreach, which indicated the need for later hours, more frequent service, quality infrastructure at stops, and new destinations (including 71st High School).



The general recommendations for the transit system include:

- Extend service hours to about 10 pm – phased implementation
- Offer 30 minute frequencies for most productive routes (14, 6, 5)
- Offer Sunday service on most productive routes (14, 12, 6)
- Move City-wide multimodal center to a site on west side of downtown
- Develop transit center at Cross Creek Mall
- Additional benches and shelters – at stops with more than 25 boardings per day
- New Bus Stop signage – approximately 550 signs
- Improved system map and website

The only recommendation specific to Raeford Road was to split Route 15. One of the split routes would provide direct connection between Cape Fear Valley Hospital and the Cross Creek Mall. The other half would provide service to the Arran Lakes-Arran Hills-Winter Park neighborhoods, Bunce Road, Cliffdale, and Skibo.

City of Fayetteville Wayfinding Plan

The City of Fayetteville currently is developing a wayfinding plan for the community that will provide general guidance and navigation to various area destinations. An example of the signage recommended as part of that study is shown below.

Early indications are some level of signage may be included along Raeford Road. The recommended signage locations from that study should be included with the application and implementation of the streetscape and access management improvements in **Chapter 4** of this report.

Existing Conditions Analysis

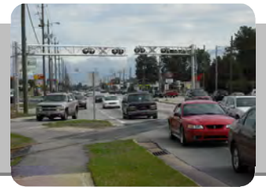
The existing conditions analysis provides the foundation for the rest of the plan, including the development of planning level and corridor specific improvements and recommendations. The existing conditions analysis included a thorough field review of existing conditions, traffic analysis (Synchro and a V/C run from data collection), and crash data review along the Raeford Road corridor. As part of the existing conditions analysis, the project team collected traffic data at 20 intersections along the corridor, including:

- Graham Road / Seventy First School Road
- Strickland Bridge Road
- Bunce Road
- Bingham Drive
- Revere Street
- Wildwood Drive
- Skibo Road
- Sandalwood Drive
- Hope Mills Road
- Brighton Road
- Montclair Road
- Ireland Drive
- Roxie Avenue / Ferncreek Drive
- All American Expressway Ramps
- McPherson Church Road / Owen Drive
- Cambridge Drive
- Fairfield Road
- Marlborough Road
- Purdue Drive
- Robeson Street

The remainder of this section provides a review of the existing conditions analysis and provides some of the key findings that were later used in the development of recommendations.

Field Data Collection

Prior to formulating recommendations for the ***Raeford Road Corridor Study***, a field review of the corridor was performed by members of the project team. A walking audit of the corridor was performed in March 2010. The purpose of this exercise was to field-verify data such as pavement widths and environmental constraints that were observed during a review of electronic data sources. During this field visit, a preliminary hydrologic assessment was performed to identify major obstacles to constructability. In addition, intersections exhibiting high crash rates were studied to document any geometric, traffic operation, and environmental constraints. The ultimate outcome of this field work was a set of validated data sources, field observations, and documented issues that were considered and applied during the development of the conceptual plan for the corridor.


City of Fayetteville Average Daily Traffic (1998 – 2008)

The existing conditions analysis began with a review of existing average daily traffic volumes. Historic traffic volumes along the Raeford Road corridor were pulled between 1998 and 2008. These data can be seen in **Table 2.3**. Overall, it can be observed that most of the traffic volumes documented along Raeford Road steadily grew between 1998 and 2006, with a slight leveling-off or decline in 2008. The amount of growth observed on average during this period was 9%. Using the recorded volumes with the established roadway capacity, a volume to capacity (V/C) ratio was calculated for each segment, along with a level of service (LOS). These congestion indicators are discussed in the next section.

Table 2.3 - Raeford Road Segment ADTs, V/C Ratios, and LOS

Segment	1998	2000	2002	2004	2006	2008	V/C	LOS
Near 71st School Road	23000	24000	28000	31000	33000	28000	0.57	B
Near Bunce Road	31000	31000	40000	38000	39000	32000	0.65	C
Near Skibo Road	42000	44000	53000	53000	53000	43000	0.58	B
Near Hope Mills Road	36000	40000	41000	43000	39000	38000	0.51	B
Near Montclair Road	39000	40000	40000	43000	38000	38000	0.51	B
Near Aberdeen Rockfish Railroad	24000	35000	37000	41000	35000	35000	0.47	A
Near Robeson Street	31000	28000	29000	30000	27000	27000	0.37	A

Traffic Analysis

V/C ratios can be correlated to roadway levels of service (LOS), which place roadway segments into six letter grade levels of the quality of service to a typical traveler on the facility. An "A" describes the highest level (least congestion) and level "F" describes the lowest level (most congestion). Levels of service can be grouped into the following categories.

- **LOS A or B –** *Well Below Capacity* (V/C = less than 0.6) – Roadways operating with a V/C ratio less than 0.60 operate at optimal efficiency with no congestion during peak travel periods. This level of service usually occurs on rural or local streets.
- **LOS C** – *Approaching Capacity* (V/C = 0.6 to 0.8) – As the V/C nears 0.8, the roadway becomes more congested. A roadway approaching capacity may operate effectively during non-peak hours, but may be congested during morning and evening peak travel periods.
- **LOS D** – *At Capacity* (V/C = 0.8 to 1.0) – Roadways operating at capacity are somewhat congested during non-peak periods, with congestion building during peak periods. A change in capacity due to incidents impacts the travel flow on corridors operating within this V/C range. LOS D is the MPO target service level.
- **LOS E** – *Slightly Over Capacity* (V/C = 1.0 to 1.2) – Roadways operating with V/C ratios between 1.0 and 1.2 experience heavy congestion during peak periods and moderate congestion during non-peak periods. Changes in capacity can have major impacts on corridors and may create gridlock conditions.
- **LOS F** – *Well Over Capacity* (V/C = greater than 1.2) – Roadways in this category represent the most congested corridors in the study area. These roadways are congested during non-peak hours and most likely operate in stop-and-go gridlock conditions during the morning and evening peak travel periods.

A full corridor level of service analysis was completed as part of the existing conditions analysis. For this analysis, traffic data were collected at the major intersections along Raeford Road. The input traffic data were collected on February 24, February 25, and March 1, 2010. Following the completion of these data, they were translated into peak hour volumes. The City of Fayetteville provided a Synchro analysis file that incorporated their AM and PM traffic signal timings. Since these daily signal timings change based on input and manual revisions from the City Traffic Engineer, these were only approximate values. These intersection levels of service and average seconds of delay were calculated for current year conditions, and projected for the study's 2035 horizon year, as shown in **Table 2.4**.

A comparison of **Table 2.3** and **Table 2.4**, reveals the majority of congestion along Raeford Road occurs around intersections rather than along segments. Three intersections currently operate slightly over capacity during the AM or PM peak period, while one intersection (Emeline Avenue/ Marlborough Road) is well over capacity during the AM peak period. In 2035, the number of over capacity intersections is anticipated to increase to eight.

Figure 2.1 shows the AM and PM levels of service at the intersections documented in **Table 2.4**. This map also indicates the location of signalized intersections along the Raeford Road corridor.

Table 2.4 - Raeford Road Intersection Levels of Service and Delays

Intersection	Existing Conditions LOS (Delay)		2035 No-Build LOS (Delay)	
	AM	PM	AM	PM
71st School Rd./Graham Rd.	D (53.2)	D (46.4)	F (138.4)	F (143.2)
Strickland Bridge Rd.	B (15.8)	C (25.0)	E (55.4)	C (29.5)
Bunce Rd.	D (54.8)	E (56.7)	F (86.6)	F (124.9)
Bingham Dr.	B (13.1)	B (17.0)	B (14.6)	B (17.2)
Revere St.	A (7.1)	B (16.4)	A (9.4)	C (29.0)
Wildwood Dr.	E (35.1)*	D (31.0)*	D (25.3)*	E (44.2)*
Skibo Rd.	C (25.8)	C (34.4)	D (36.2)	D (43.8)
Sandalwood Dr.	A (7.5)	B (11.3)	A (9.6)	B (13.1)
Hope Mills Rd.	C (23.7)	C (25.3)	C (26.2)	C (26.8)
Brighton Rd.	B (15.6)	C (32.8)	B (16.9)	D (38.3)
Montclair Rd.	A (5.6)	A (5.6)	A (6.1)	A (8.9)
Ireland Dr.	C (25.5)	C (29.0)	D (40.5)	D (35.4)
Roxie Ave/Ferncreek Dr.	B (18.3)	D (39.2)	D (46.7)	F (80.6)
All American Expressway SB Ramp	E (60.4)	C (21.8)	E (78.4)	C (34.7)
All American Expressway NB Ramp	B (12.2)	B (14.2)	B (16.6)	B (15.6)
Owen Dr./McPherson Church Rd.	D (37.1)	C (33.4)	D (38.9)	D (36.3)
Cambridge St.	A (9.0)*	B (10.3)*	A (9.0)*	B (10.3)*
Fairfield Rd.	A (4.8)	B (16.7)	A (5.1)	B (17.6)
Emeline Ave./Marlborough Rd.	F (56.1)*	E (38.8)*	F (69.4)*	E (48.1)*
Purdue Dr.	B (10.5)	C (26.8)	B (11.2)	C (28.5)
Robeson St.	D (38.5)	D (47.3)	D (45.8)	F (89.4)

* = *unsignalized intersection*

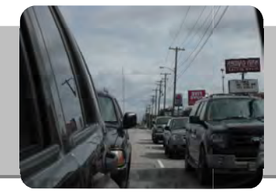
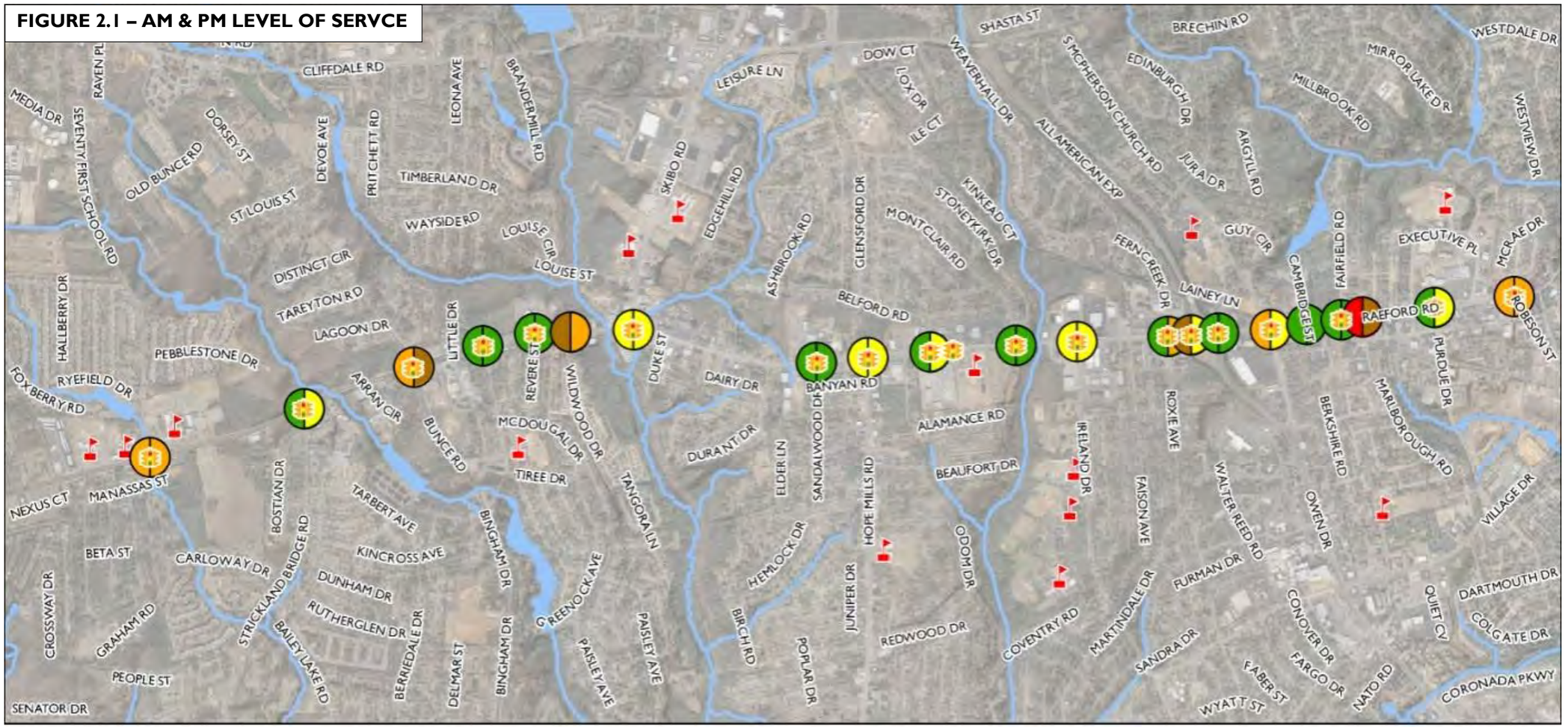


FIGURE 2.1 – AM & PM LEVEL OF SERVCE

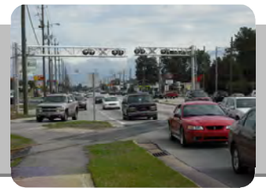


Legend

- AM/PM Level of Service
- LOS B or Better
- C
- D
- E
- F
- Signals

0.5 0.25 0 0.5 1 Miles

N


Traffic Safety

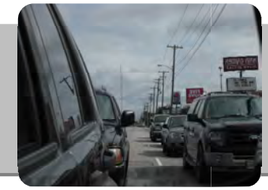
Locations where traffic safety improvements offer the most benefit to motorists often can be determined by examining crash history and traffic patterns. This section analyzes a five-year crash history along the Raeford Road corridor and identifies priority crash locations for safety-related improvements. From November 2004 to October 2009, 2,465 crashes occurred on Raeford Road between Hampton Oaks Drive and Robeson Street. These crashes included six fatal crashes and 822 injury crashes. The overall crash rate for this portion of the corridor was 727.72 crashes per 100 million vehicle miles traveled. The statewide average crash rate for a comparable route is 395.46 crashes per 100 million vehicle miles traveled. Based on this statistic, Raeford Road has an 84% higher occurrence of crashes than comparable corridors. **Table 2.5** lists segments of Raeford Road and their most common collision type. This table also includes frequency and severity statistics and the intersection's equivalent property damage only (EPDO) rate – a measure of the total crash costs at a location, weighting fatal and injury crashes higher than property damage only crashes.

It should be noted that 1,920 crashes (78% of the total for the corridor) occurred at mid-block locations. This large percentage is unusual for a corridor and clearly indicates the main safety concern is unregulated turning movements and driveway openings.

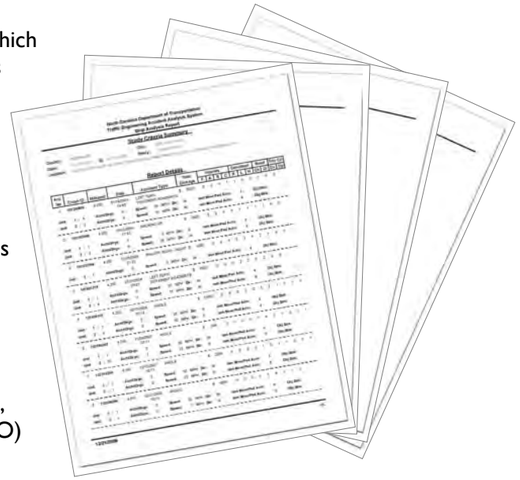
The most frequent crash type is the rear end collision, which occurred in 41% of crashes during the analysis period. This crash type typically is associated with stop and go driving conditions and driver inattention. Contributing to this situation is the large number of driveway openings as well as the two way left turn lane. These factors result in an environment highly conducive to rear end collisions.

Table 2.5 - Raeford Road Segmental Crash Data and Rankings

Rank	Segment No.	From	To	Length (Miles)	Total Crashes	Fatalities	Type A Injury	Type B Injury	Type C Injury	PDO	EPDO Rate	Most Common Collision Type
1	2	71st School/Graham	Strickland	0.60	79	0	0	2	46	53	14.37	Rear End, Slow or Stop
2	9	Wildwood	Culvert	0.06	118	0	0	12	55	84	11.93	Rear End, Slow or Stop
3	6	Little	Bingham	0.11	59	0	0	6	45	36	10.87	Rear End, Slow or Stop
4	22	Scotland	Montclair	0.23	61	0	0	4	42	33	10.08	Rear End, Slow or Stop
5	23	Montclair	Ireland	0.23	62	0	0	6	39	40	10.05	Rear End, Slow or Stop
6	7	Bingham	Revere	0.20	74	0	0	4	35	56	8.24	Rear End, Slow or Stop
7	4	Arron	Bunce	0.20	38	0	0	1	38	21	8.16	Rear End, Slow or Stop
8	15	Durant	Sandalwood	0.18	43	1	0	5	24	26	8.11	Rear End, Slow or Stop
9	25	Faison	Roxie	0.14	57	1	0	2	23	45	7.77	Rear End, Slow or Stop
10	11	Skibo	Duke	0.11	60	0	0	1	29	44	7.11	Rear End, Slow or Stop
11	1	Hampton Oaks/Festival	71st School/Graham	0.33	34	1	0	0	17	25	6.77	Rear End, Slow or Stop
11	21	Brighten	Scotland	0.09	46	0	0	1	28	31	6.60	Rear End, Slow or Stop
13	8	Revere	Wildwood	0.26	67	0	0	1	32	49	6.48	Rear End, Slow or Stop
14	24	Ireland	Faison	0.19	60	0	0	6	20	42	6.26	Rear End, Slow or Stop
15	29	Putte Williams	Owen/McPherson	0.16	38	0	0	2	20	27	5.53	Rear End, Slow or Stop
16	32	Cambridge	Fairfield	0.13	41	0	0	6	15	27	5.43	Rear End, Slow or Stop
17	5	Bunce	Little	0.14	43	0	0	1	22	29	5.20	Rear End, Slow or Stop
18	31	Twin Acres	Cambridge	0.06	37	0	0	2	19	22	5.18	Rear End, Slow or Stop
18	39	Purdue	Executive	0.14	32	0	0	0	14	22	4.46	Angle
20	10	Culvert	Skibo	0.04	64	0	0	3	21	46	4.27	Sideswipe, Same Direction
20	30	Owen/McPherson Church	Twin Acres	0.07	36	0	0	4	12	27	4.21	Rear End, Slow or Stop
22	3	Strickland	Arron	0.24	39	0	0	1	17	26	4.15	Rear End, Slow or Stop
23	12	Duke	Greenleaf	0.11	35	0	0	1	16	23	3.98	Rear End, Slow or Stop
24	27	All American Expressway SB	All American	0.09	19	0	1	0	8	14	3.70	Rear End, Slow or Stop
25	19	Hope Mills	Kenly	0.14	54	0	0	3	10	41	3.61	Sideswipe, Same Direction
26	38	Ravenhill	Purdue	0.08	23	0	0	0	11	16	3.37	Rear End, Slow or Stop
26	18	Karr	Hope Mills	0.04	20	0	0	0	14	12	3.03	Rear End, Slow or Stop
28	26	Roxie	All American	0.10	28	0	0	1	10	21	2.66	Rear End, Slow or Stop
29	20	Kenly	Brighten	0.08	32	0	0	1	9	26	2.64	Rear End, Slow or Stop
29	16	Sandalwood	Eucalyptus	0.10	27	0	0	1	8	18	2.19	Rear End, Slow or Stop
31	36	Starhill	Willborough	0.06	15	0	0	1	6	10	2.03	Rear End, Slow or Stop
32	40	Executive	Forsyth	0.09	11	0	0	0	6	8	1.92	Rear End, Slow or Stop
33	14	Pompton	Durant	0.13	15	0	0	3	4	9	1.63	Rear End, Slow or Stop
34	41	Forsyth	Robeson	0.06	12	0	0	1	3	9	1.44	Sideswipe, Same Direction
35	33	Fairfield	Emeline	0.07	12	0	0	2	3	9	1.39	Rear End, Slow or Stop
36	37	Willborough	Ravenhill	0.08	14	0	0	0	4	11	1.35	Rear End, Slow or Stop
37	35	Marlboro	Starhill	0.04	10	0	0	0	4	6	1.14	Angle & Rear End, Slow or Stop
38	13	Greenleaf	Pompton	0.16	12	0	0	1	3	9	1.02	Rear End, Slow or Stop
39	28	All American Expressway NB	Putte Williams	0.03	9	0	0	0	3	6	0.81	Rear End, Slow or Stop
40	17	Eucalyptus	Karr	0.05	10	0	0	0	2	8	0.58	Rear End, Slow or Stop
41	34	Emeline	Marlboro	0.02	8	0	0	0	1	7	0.43	Angle & Sideswipe, Same Direction



The second most frequent crash type is the angle collision, which accounts for 21% of crashes that occurred during the analysis period. These crashes occur when two or more vehicles (usually from opposite directions) collide when one vehicle moves across the path of the other vehicles.



The third most frequent crash type is the side swipe collision which was observed 16% of the time during the analysis period. These collisions are a result of the narrow travel lanes as well as the ability of traffic to turn at will due to the presence of the two way left turn lane.

Table 2.6 provides a breakdown of traffic safety at the intersections along the corridor. This table includes crash frequency and severity statistics, most common collision type, and the intersection's equivalent property damage only (EPDO) rate. The crashes in this list are ranked based on their EPDO rate, or the overall severity or crash costs at each location.

The number one ranked intersection is Roxie Drive. With 13 injuries in 25 total crashes, this location has an EPDO rate more than twice as much as any other intersection. The most common crash type was angle crashes, which typically result from conflicting movements of turning vehicles. Notably, the top seven intersections all experience angle crashes as their most common collision type.

Figure 2.2 displays the segment and intersection crash frequencies for the Raeford Road corridor.

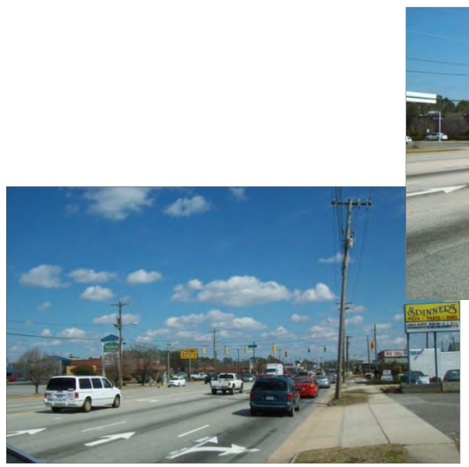
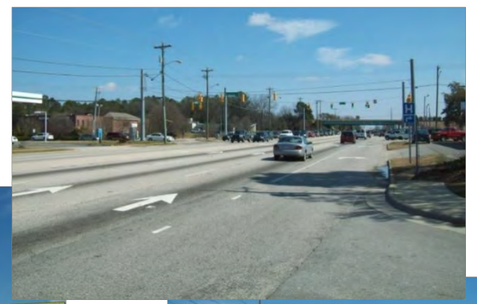
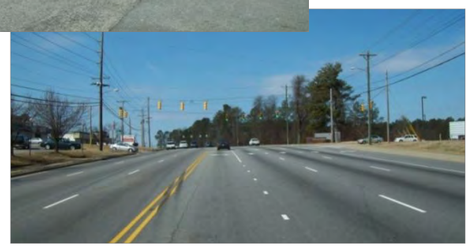
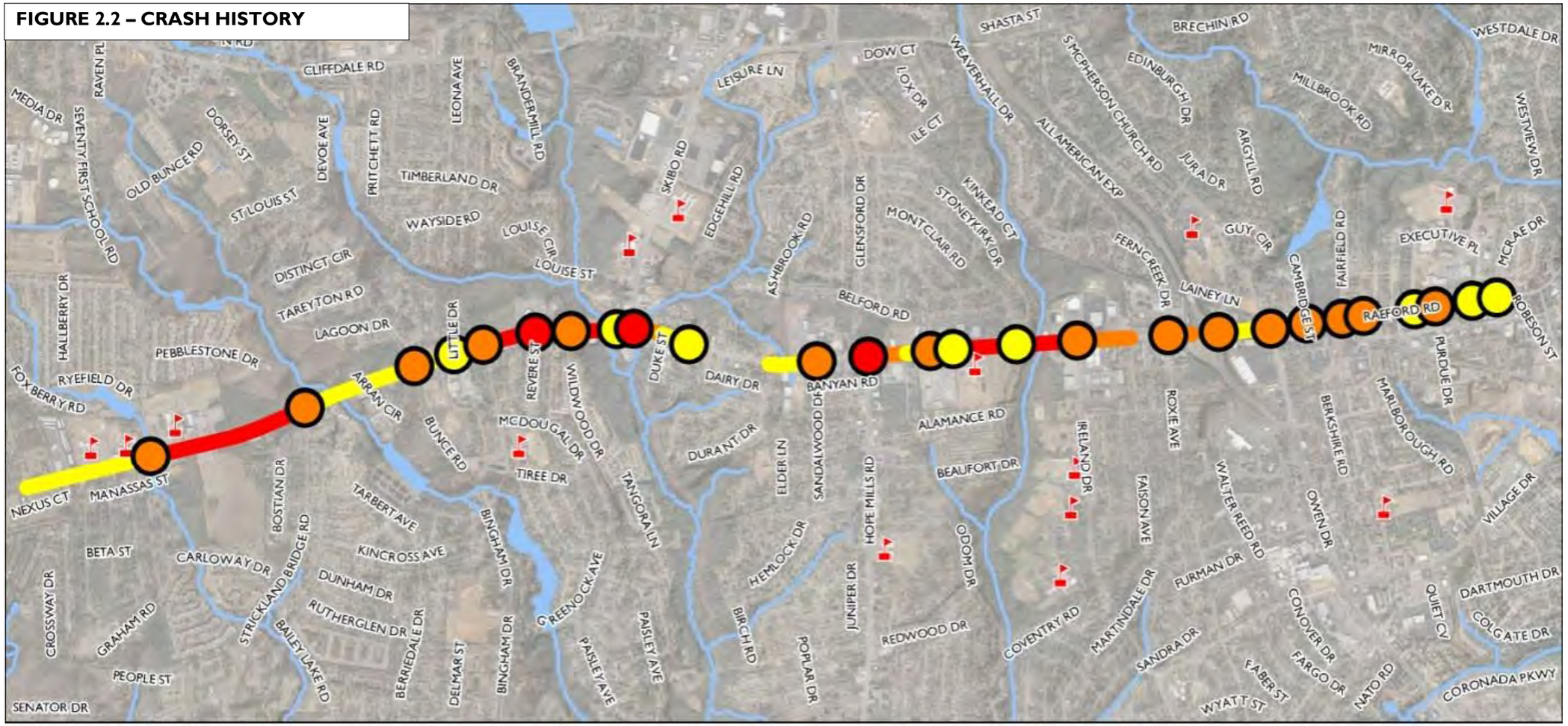




Table 2.6 - Raeford Road Intersection Crash Data and Rankings

Rank	Intersection	Milepost	Total Crashes	Fatalities	Type A Injury	Type B Injury	Type C Injury	PDO	EPDO Rate	Most Common Collision Type
1	Roxie	8.36	25	0	1	3	9	17	27.13	Angle
2	Revere	6.02	68	1	1	14	36	44	12.53	Angle
3	Purdue	9.35	42	1	1	1	20	25	11.34	Angle
4	Brighten	7.48	42	0	0	11	36	21	8.82	Angle
5	Cambridge	8.87	32	0	1	1	26	18	8.59	Angle
6	Hope Mills	7.26	75	0	1	5	27	55	7.32	Angle
7	Bunce	5.57	33	0	0	11	31	16	6.91	Angle
8	Bingham	5.82	42	0	1	4	20	31	6.28	Rear End, Slow or Stop
9	Forsyth	9.58	13	1	0	5	6	6	5.93	Left Turn, Different Roadways & Left Turn, Same Roadway & Angle
10	Skibo	6.38	76	0	0	12	28	54	5.70	Sideswipe, Same Direction
11	Ireland	8.03	42	0	0	4	25	26	5.60	Angle
12	Sandalwood	7.07	37	0	0	4	22	22	5.32	Angle
13	Fairfield	9.00	26	0	0	2	19	14	5.21	Angle
14	Marlboro	9.09	26	0	0	5	15	19	5.14	Angle
15	Wildwood	6.28	30	0	0	4	22	15	4.74	Rear End, Slow or Stop
16	71st School/Graham	4.53	24	0	0	2	19	11	4.14	Rear End, Slow or Stop
17	Greenleaf	6.60	16	0	0	4	14	8	3.83	Rear End, Slow or Stop
18	Executive	9.49	16	0	0	4	8	10	3.64	Angle
19	Strickland	5.13	26	0	0	2	12	20	3.06	Rear End, Slow or Stop
20	Scotland	7.57	18	0	0	2	12	9	3.04	Angle
21	Twin Acres	8.81	7	0	1	0	3	4	2.77	Rear End, Slow or Stop
22	All American Expressway NB	8.55	27	0	0	4	10	17	2.69	Angle
23	Eucalyptus	7.17	9	0	0	3	10	5	2.67	Rear End, Slow or Stop
24	Duke	6.49	6	0	0	0	12	1	2.45	Rear End, Slow or Stop
25	Owen/McPherson Church	8.74	24	0	0	2	12	17	2.43	Angle
26	Hampton Oaks/Festival	4.20	10	0	0	1	7	5	2.00	Angle
27	Starhill	9.13	8	0	0	3	4	5	1.88	Angle
28	Kenly	7.40	7	0	0	4	5	2	1.84	Angle
29	Culvert	6.34	14	0	0	1	7	10	1.47	Rear End, Slow or Stop
30	Putte Williams	8.58	4	0	0	0	7	1	1.19	Left Turn, Same Roadway
31	Little	5.71	12	0	0	1	8	5	1.15	Rear End, Slow or Stop
32	Ravenhill	9.27	13	0	0	1	2	11	1.12	Angle
33	Montclair	7.80	12	0	0	1	4	7	1.12	Rear End, Slow or Stop
34	Faison	8.22	7	0	0	0	5	4	1.06	Rear End, Slow or Stop
35	Arron	5.37	6	0	0	1	3	2	0.93	Rear End, Slow or Stop
36	Karr	7.22	2	0	0	0	4	0	0.79	Angle & Rear End, Slow or Stop
37	Willborough	9.19	10	0	0	0	2	8	0.75	Rear End, Slow or Stop & Left Turn, Same Roadway
38	Emeline	9.07	3	0	0	0	3	1	0.73	Left Turn, Different Roadways & Left Turn, Same Roadway & Right Turn, Same Roadway
39	Durant	6.89	8	0	0	2	1	5	0.72	Left Turn, Different Roadways
40	Robeson	9.64	8	0	0	0	0	8	0.24	Ran Off Road - Right & Rear End, Slow or Stop & Sideswipe, Same Direction
41	All American Expressway SB	8.46	4	0	0	0	1	3	0.23	Rear End, Slow or Stop
42	Pompton	6.76	1	0	0	0	0	1	0.02	Rear End, Turn

FIGURE 2.2 – CRASH HISTORY



Legend

- 10 - 20 crashes
- 20 - 50 crashes
- > 50 crashes
- 30 - 45 crashes
- 45 - 60 crashes
- > 60 crashes

0.5 0.25 0 0.5 1 Miles

N



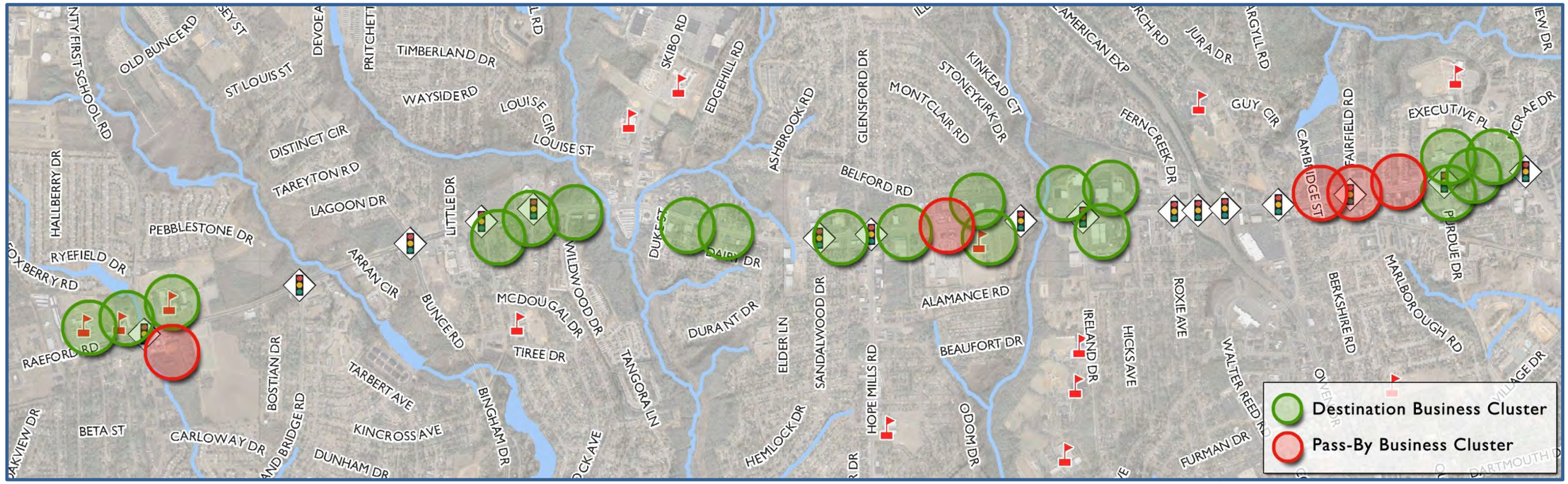
Business Profile

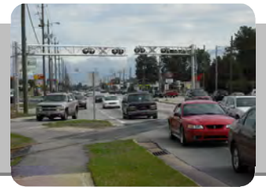
Pass-By and Destination Businesses

As a 2-lane roadway, Raeford Road once served as a rural highway connecting the countryside to the county's urban core. As growth occurred and the corridor was widened, the role of the road expanded. Today, numerous businesses (and schools) depend on Raeford Road's ability to deliver patrons to their doorstep. These businesses can be categorized as "pass-by" or "destination". Pass-by businesses are businesses most often frequented by commuters who stop on impulse. Destination businesses are businesses that most often are the final point of a planned trip. That is, people travel to Raeford Road to visit a specific destination business. Successful corridors have a mix of business types. The map below shows clusters (defined as 4 or more contiguous businesses) of pass-by and destination businesses on the Raeford Road corridor. This information was determined using a windshield survey and a business questionnaire.

- More than 230 businesses were identified (180 Destination, 53 Pass-By).
- 50% of the businesses were retail shops (grocery, drug store, department store, etc.).
- Most clusters are located in eastern portion of the corridor.
- Destination clusters are more dispersed throughout the corridor and include the schools near 71st School Road and the office buildings near Executive Place.
- Pass-by clusters include the area between Cambridge Street and Ravenhill Road.

Business Clusters




Businesses Questionnaire

A business questionnaire supplemented data collected from the city and county and windshield survey. A total of 30 businesses were surveyed to gain a better perspective on the level of pass-by and destination businesses along the corridor. Most businesses surveyed were destination in nature, though within this subset a diversity of companies was selected (retail shops, offices, car dealers, and general service).

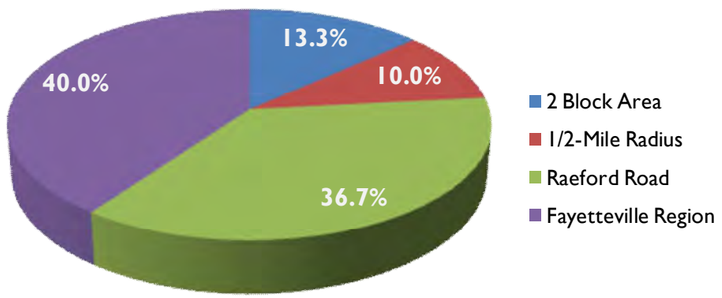
General Trends

- 66% were business owners
- 53% were owner/operator rather than a lease
- 80% identified their customer base as destination customers
- 66% had three or more driveways
- 30% had direct access to a traffic signal
- 60% stated a crash had impacted access to their business
- 53% indicated peak hour congestion impacted their business
- 83% supported aesthetic improvements

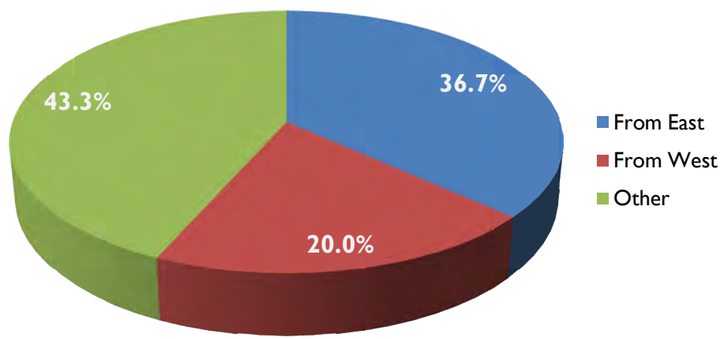
Concerns:

- Traffic congestion
- Speeding cars
- Lack of aesthetics
- Lack of access
- Too many signs
- Making turns where there is no light
- Too many traffic signals
- Poor timing of signals
- Poor business visibility

Location of Primary Competitor



Customer Base Origin



Comments

Traffic congestion is an <u>all</u> day issue.

On Skibo/Raeford, it is hard to get out of parking lot whether turning right or left.

<u>Too</u> many signs and **<u>too</u>** many light poles. They're an eyesore.

Cars fly by almost like a **<u>racetrack</u>**.

<u>Traffic</u>. Lunchtime is <u>impossible</u> for employees to get out.

<u>My concern</u> - cars making left turns where there isn't a light.

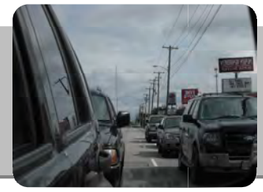
I fear the median will be put in and not improve traffic.

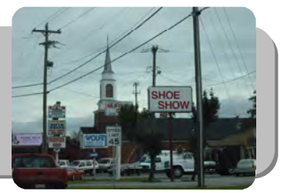
No true concern other than **<u>aesthetics</u>**.

No attention to the speed limit.

<u>It's not safe now.</u>
It's very hard to turn left.

Reducing the speed limit would be **<u>helpful</u>** and **<u>safer</u>**.





CHAPTER 3 – BEST PRACTICES TOOLBOX

The ***Raeford Road Corridor Study*** supports economic growth and diversification on and around the corridor by planning strategic investments for a connected, multimodal transportation network. While the heart of the study includes an integrated set of multimodal transportation recommendations, the study also serves as a resource for policy-makers and citizen advocates. Sustained growth brings benefits (new cultural, recreational, and economic opportunities) and creates challenges (additional traffic congestion, pollution, safety concerns, loss of open space, impacts to quality of life). One component of the study is to provide local planners and administrators a set of tools to respond to these challenges. The Transportation Best Practices Toolbox provides background information and guiding principles on access management, bicycle and pedestrian planning, collector street planning, transit planning, and complete streets. This information sets the stage for the multimodal recommendations that follow in subsequent chapters.

Access Management

As Raeford Road continues to attract development, protecting the pass-through capacity becomes essential for the efficiency of the transportation system and continued regional growth. Access management balances the needs of motorists traveling through a corridor with the need to maintain access to developments located along the corridor. Given the scarcity of transportation dollars, access management is more than a good policy directive —it is essential to ensuring the longevity of transportation investments. Without access management, the function and character of major roadway corridors can deteriorate rapidly and adjacent properties can suffer from declining property values and high turnover.

The Federal Highway Administration (FHWA) defines access management as "the process that provides access to land development while simultaneously preserving the flow of traffic on the surrounding system in terms of safety, capacity, and speed." According to the Access Management Manual, access management results from a cooperative effort between state and local agencies and private land owners to systematically control the "location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway."[1] Access management requires cooperation between government agencies and private land owners.

Access Management Overview

Poor access management directly affects the livability and economic vitality of commercial corridors, ultimately discouraging potential customers from entering the area. A corridor with poor access management lengthens commute times, creates unsafe conditions, lowers fuel efficiency, and increases vehicle emissions. Signs of a corridor with poor access management include:

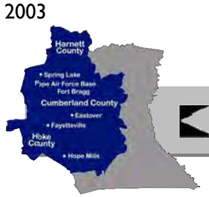
- Increased crashes between motorists, pedestrians, and cyclists
- Worsening efficiency of the roadway
- Congestion outpacing growth in traffic
- Spillover cut-through traffic on adjacent residential streets
- Limited sustainability of commercial development

Access management has wide-ranging benefits to a variety of users as shown in **Table 3.1.**

Table 3.1 - Benefits of Corridor Access Management

User	Benefit
Motorists	▪ Fewer delays and reduced travel times ▪ Safer traveling conditions
Bicyclists	▪ Safer traveling conditions ▪ More predictable motorist movements ▪ More options in a connected street network
Pedestrians	▪ Fewer access points and median refuges increase safety ▪ More pleasant walking environment
Transit Users	▪ Fewer delays and reduced travel times ▪ Safer, more convenient trips to and from transit stops in a connected street and sidewalk network
Freight	▪ Fewer delays and reduced travel times lower cost of delivering goods and services
Business Owners	▪ More efficient roadway system serves local and regional customers ▪ More pleasant roadway corridor attracts customers ▪ Stable property values
Government Agencies	▪ Lower costs to achieve transportation goals and objectives ▪ Protection of long-term investment in transportation infrastructure
Communities	▪ More attractive, efficient roadways without the need for constant road widening

[1] Access Management Manual, Transportation Research Board, National Academy of Sciences, Washington DC, 2003





As development continues along Raeford Road and Fayetteville's heavily traveled corridors, protecting the pass-through capacity will be important for the well being of the transportation system and economic vitality of the region.

Access Management Strategy Toolkit

Access management is not a one-size fits all solution to corridor congestion. A diversity of techniques will be required along the Raeford Road corridor and its surrounding facilities. The toolkit that follows provides a general overview of the various strategies available to manage congestion and its negative effects. A comprehensive access management program includes evaluation methods and supports the efficient and safe use of the corridors for all transportation modes. The purpose of the toolkit is to provide local engineering and planning officials with access management techniques as well as an overview of their application.

The access management solutions outlined in this chapter can be divided into four major categories: site access treatments, median treatments, intersection and minor street treatments, and intelligent transportation systems. **Tables 3.2 and 3.3** detail the specific tools included in each of these categories, the benefits of implementing each solution, best practices, agencies, and costs (where available). An overview of these four major categories is also included here.

Site Access Treatments

Improvements that reduce the total number of vehicle conflicts should be a key consideration during the approval of redeveloped sites along corridors identified for access management programs. Site Access Treatments include the following:

- Improved On-Site Traffic Circulation
- Number of Driveways
- Driveway Placement/Relocation
- Cross Access to Adjacent Sites

Median Treatments

Segments of a corridor with sufficient cross access, backdoor access, and on-site circulation may be candidates for median treatments. A median-divided roadway improves traffic flow, reduces congestion, and increases traffic safety — all important goals of access management. While medians restrict some left-turn movements, overall traffic delays are reduced by removing conflicting vehicle movements from the corridor. Landscaping and gateway features incorporated into median treatments improve the aesthetics of the corridor, in turn encouraging investment in the area and contributing to the overall quality of the surrounding environment. A portion of Raeford Road has a grassy lowered median. However, it does not contain other landscaping features.

Median Treatments include the following:

- Non-Traversable Median
- Median U-Turn Treatment
- Directional Cross (Left-Over Crossing)
- Left-Turn Storage Bays
- Offset Left-Turn Treatment

Intersection and Minor Street Treatments

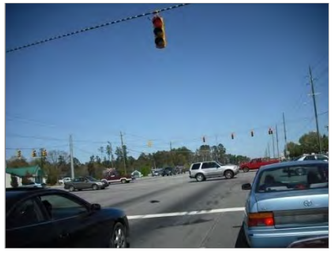
The operation of signalized intersections can be improved by reducing driver confusion, establishing proper curb radii, and ensuring adequate laneage of minor street approaches. Intersection and Minor Street Treatments include the following:

Access management results from a cooperative effort between state and local agencies and private land owners to systematically control the "location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway.

- Skip Marks (Dotted Line Markings)
- Intersection and Driveway Curb Radii
- Minor Street Approach Improvements

Intelligent Transportation Systems

Intelligent Transportation Systems (ITS) have many potential benefits when implemented in concert with an overall transportation management strategy. ITS solutions use communications and computer technology to manage traffic flow in an effort to reduce crashes, mitigate environmental impacts such as fuel consumption and emissions, and reduce congestion from normal and unexpected delays. Successful systems include a variety of solutions that provide surveillance capabilities, remote control of signal systems components, seamless sharing of traveler information with the public, and even allow emergency vehicles to have priority to proceed safely through signalized intersections. Intelligent Transportation Systems include the following:



- Signalization
- Progressive-Controlled Signal System
- Dynamic Message Signs (DMS)
- Closed Circuit Television (CCTV) Traffic Monitoring
- Emergency Vehicle Preemption

The City of Fayetteville has already implemented some of these solutions, including a traffic responsive signal system and some CCTV cameras along Raeford Road.

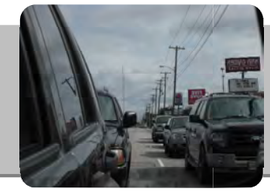


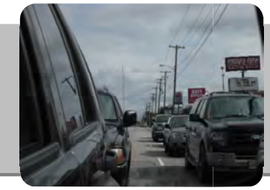
Table 3.2 - Corridor Access Management Tools (Site Access and Median Treatments)

Treatment	Benefit	Best Practice Action	Responsible Agency	Estimated Cost
Site Access Treatments				
Improved On-Site Traffic Circulation	▪ Congestion Relief ▪ Safety Improvement ▪ Aesthetic Enhancement	▪ Throat length of at least 100' to avoid spillback ▪ Create a "gateway" feel to retail area entrances	▪ Private development	▪ Varies
Optimize Number of Driveways	▪ Congestion Relief ▪ Safety Improvement ▪ Bike/Ped Mobility	▪ Provide minimum number of driveway connections necessary for reasonable access ▪ Implement shared access easements	▪ Private development	▪ Varies
Driveway Placement/Relocation	▪ Congestion Relief ▪ Safety Improvement	▪ Relocate or close driveways within 100' of intersections	▪ Private development ▪ City of Fayetteville	▪ Varies
Cross-Access	▪ Congestion Relief ▪ Economic Benefit ▪ Emergency Service Access	▪ Internal site traffic circulation connecting numerous businesses ▪ Backdoor site access away from main road	▪ Private development	▪ Varies
Median Treatments				
Non-Traversable Median	▪ Safety Improvement ▪ Aesthetic Enhancement ▪ Bike/Ped Mobility ▪ Congestion Relief	▪ Separate opposing vehicle flows ▪ Provide sufficient spacing and locations for U-turn and left-turn traffic	▪ NCDOT ▪ City of Fayetteville ▪ FAMPO	▪ Varies
Median U-Turn Treatment	▪ Safety Improvement ▪ Congestion Relief ▪ Bike/Ped Mobility ▪ Emergency Service Access	▪ Locate with sufficient space for U-turn movements ▪ Consider weaving distance and avoid excessive travel distance	▪ NCDOT ▪ City of Fayetteville ▪ FAMPO	▪ $50,000-$60,000 per median opening
Directional Crossover (Left-Over)	▪ Congestion Relief ▪ Safety Improvement	▪ Locate in areas with high traffic volumes on the major road, lower through traffic on the cross road ▪ Divert some left turns from intersections to reduced conflict point	▪ NCDOT ▪ City of Fayetteville ▪ FAMPO	▪ Varies
Left Turn Storage Bays	▪ Congestion Relief ▪ Safety Improvement ▪ Emergency Service Access	▪ Include storage lengths to accommodate forecasted traffic levels ▪ Minimize right-of-way needs by constructing within existing median	▪ NCDOT ▪ City of Fayetteville ▪ FAMPO	▪ Varies
Offset Left-Turn Treatment	▪ Congestion Relief ▪ Safety Improvement	▪ Shift left-turn lanes adjacent to the innermost lane of oncoming through traffic to improve visibility and reduce crossing time ▪ Inexpensive retrofit of median with sufficient width	▪ NCDOT ▪ City of Fayetteville ▪ FAMPO	▪ Varies

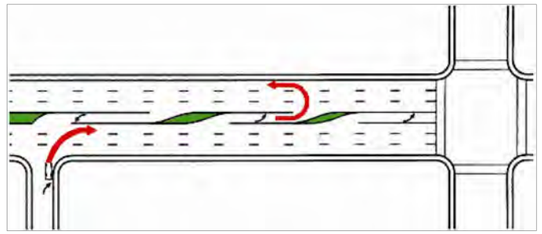


Table 3.3 - Corridor Access Management Tools (Intersection/Minor Street Treatments and ITS)

Treatment	Benefit	Best Practice Action	Responsible Agency	Estimated Cost
Intersection and Minor Street Treatments				
Skip Marks (Dotted Line Markings)	▪ Safety Improvement	▪ Ideal for offset, skewed, or multi-legged intersections ▪ Consider for intersections with multiple turn lanes ▪ Design to avoid driver confusion in adjacent or opposing lanes	▪ NCDOT ▪ City of Fayetteville ▪ FAMPO	▪ Varies
Intersection and Driveway Curb Radii	▪ Safety Improvement ▪ Bike/Ped Mobility ▪ Emergency Service Access ▪ Aesthetic Enhancement	▪ Size curb radii for area context and likely vehicular usage ▪ Consider existing and desired travel speeds	▪ Private development ▪ NCDOT ▪ City of Fayetteville ▪ FAMPO	▪ Varies
Minor Street Approach Improvements	▪ Congestion Relief ▪ Bike/Ped Mobility	▪ Reallocate or optimize signal timing to reduce major street delay ▪ Consider laneage improvements on minor street approaches	▪ NCDOT ▪ City of Fayetteville ▪ FAMPO	▪ Varies
One-Way Frontage Roads	▪ Congestion Relief ▪ Safety Improvement ▪ Economic Benefit	▪ Convert two-way service roads to one-way with slip ramps ▪ The addition of back door collector street access may be needed prior to one-way conversion	▪ NCDOT ▪ City of Fayetteville ▪ FAMPO	▪ $1 million per mile
Intelligent Transportation Systems (ITS)				
Signalization	▪ Safety Improvement ▪ Bike/Ped Mobility ▪ Congestion Relief	▪ Consider signal spacing before adding to the system ▪ Reduce delay and safety issues without adversely affecting major roadway operations	▪ NCDOT ▪ City of Fayetteville ▪ FAMPO	▪ $60,000 per signal
Progressive-Controlled Signal System	▪ Safety Improvement ▪ Congestion Relief ▪ Bike/Ped Mobility ▪ Emergency Service Access	▪ Space and synchronize traffic signals to allow for continuous flow along the corridor ▪ Continuously collect traffic volumes to alter signal timing and phasing to serve real-time traffic levels	▪ City of Fayetteville ▪ FAMPO	▪ $250,000 per system ▪ $10,000 per intersection ▪ Add training costs
Dynamic Message Signs (DMS)	▪ Congestion Relief ▪ Safety Improvement	▪ Give delay or incident information to alert motorists of conditions ▪ Inform drivers so they can select alternate routes if needed	▪ NCDOT ▪ City of Fayetteville ▪ FAMPO	▪ Varies
Closed Circuit Television (CCTV) Monitoring	▪ Congestion Relief ▪ Safety Improvement ▪ Emergency Service Access	▪ Collect traffic volume and flow information to use in traffic management centers ▪ Facilitates quick response to reduce the effect of incidents	▪ NCDOT ▪ City of Fayetteville ▪ FAMPO	▪ $20,000 per location
Emergency Vehicle Preemption	▪ Safety Improvement ▪ Emergency Service Access	▪ Stops conflicting movements to improve emergency vehicle response time and safety	▪ City of Fayetteville ▪ FAMPO	▪ $5,000-$7,000 per intersection ▪ $2,000 per vehicle



Corridor Access Management Tools

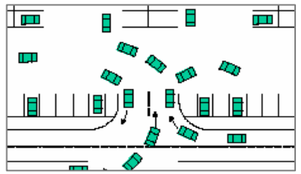


Median U-Turn Treatment

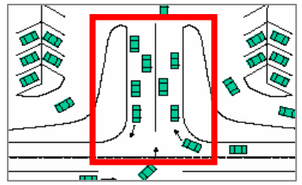
Emergency Vehicle Preemption

CCTV Camera

Before



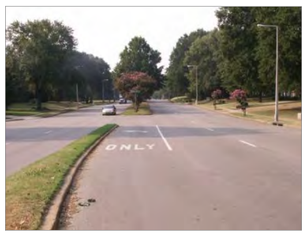
After



Driveway Throat

Offset Left-Turn Treatment

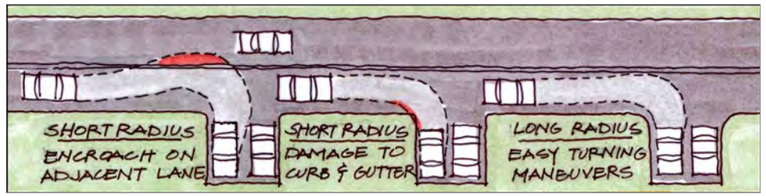
Directional Crossover (Left-Over)



Left-Turn Storage Bay

Dynamic Message Sign

Non-Traversable Median



Intersection and Driveway Curb Radii

Shared Driveway Access and Cross-Access Connection



Complete Streets

"Complete streets" describes the transformation of vehicle-dominated thoroughfares to community-oriented streets with safe, convenient accommodations for all modes of travel. Through the public feedback process, the need for a complete streets approach was expressed for the future of Raeford Road. Members of the public pointed to speeding motorists, unsafe and unpleasant conditions for pedestrians and bicyclists, and the lack of transit amenities as reason this approach is needed for Raeford Road. The complete streets approach complements and enhances the other elements of this Best Practices Toolbox.

The ideal complete street accommodates every travel mode – pedestrians, bicyclists, motorists and transit riders of all ages and abilities. These streets give citizens choices and are designed and operated so they work for all users. When residents have the opportunity to walk, bike, or take transit, they have more control over their transportation expenses. Instituting a complete streets policy ensures that transportation planners and engineers consistently design and operate the entire roadway for a diversity of users.

Transforming an arterial such as Raeford Road into a complete street is complicated and requires a diverse skill set and broad community support. Fortunately, other metropolitan areas have demonstrated success stories that have been translated into guiding documents. The most detailed guidance comes from a joint effort of the Institute of Transportation Engineers and Congress for the New Urbanism. With funding from the U.S. Department of Transportation and the U.S. Environmental Protection Agency, best practices have been published as "Context-Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities."

Successful complete street transformations require community support and leadership as well as coordination between various disciplines. Common goals for complete streets are economic revitalization, business retention and expansion, and public safety. Typical skill sets needed to retrofit complete streets include urban planning, urban design, landscape architecture, roadway design, utility coordination, traffic engineering, transportation planning, transit planning, architecture, graphic art, and land redevelopment.

Guiding Principles

The following principles embody the most important aspects of a successful complete streets program:

- Achieve community objectives.
- Blend street design with the character of the area served.
- Capitalize on a public investment by working diligently with property owners, developers, economic development experts, and others to spur private investment in the area. Many communities have observed a return-on-investment of $3 private for every $1 of public investment that is made. In some cases the return ratio is has high as 10:1 or more.
- Design in balance so that traffic demands do not overshadow the need to walk, bicycle, and ride transit safely, efficiently, and comfortably. The design should encourage people to walk.
- Empower citizens to create their own sense of ownership in the success of the street and its numerous characters.

Caveats

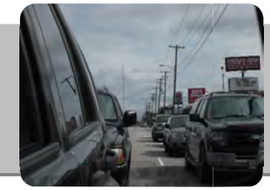
Street transformations require a tremendous effort by many stakeholders. Several factors contribute to the successful implementation of a complete streets transformation, including:

- **An interconnected network of major and minor streets** with some redundancy in traffic capacity on parallel major streets. Concern over a "loss" of traffic capacity can be tempered with "surplus" capacity elsewhere.
- **A demonstrated and well-defined problem that can be addressed with a complete street transformation.** The community should agree that the problem demands a solution and enough citizens feel compelled to show up, stand up, and speak up in support. It never will be possible to get everyone to agree with each detail of the new design, but near universal agreement on the problem definition is critical.
- **A non-profit group to create an agenda for change.** During the early phases of the transformation project, a non-profit group can help facilitate change and participate in design meetings to make sure that designers continue to pursue solutions and decisions that will ultimately achieve the community objective.

Policy Support

Beyond the support generated through the *Raeford Road Corridor Study*, the other important policy documents that should reflect complete street policies or enabling language include:

- City or County Comprehensive Plans
- Area Plans (for the applicable area served by the complete street)
- Park Master Plans (if adjacent to the corridor)
- Economic Revitalization/Development Strategies



Elements of Complete Streets

Complete streets include four distinct street realms that foster interaction between different modes of travel and adjacent land uses. The four basic zones or realms, discussed below in **Table 3.4**, are the context, pedestrian, travelway, and intersection realms. As a whole, these elements determine how the built environment and the different ways people travel directly influence the livability of a corridor. The cross-sections considered for Raeford Road in Chapter 4 reflect many of these principles.

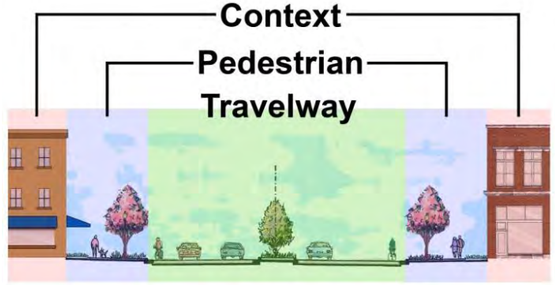


Table 3.4 – Realms of a Complete Street

Context Realm

- Defined by the buildings that frame the major roadway
- Stresses context-specific treatment for four primary areas:
  - Building form and massing
  - Architectural elements
  - Transit integration
  - Site design

Pedestrian Realm

- Extends between the outside edge of the sidewalk and the face-of-curb located along the street
- Quality of the pedestrian realm is achieved through four primary areas:
  - Continuous pedestrian facilities (on both sides of the road if possible) to maximize safety and mobility needs
  - High-quality buffers between pedestrians and moving traffic
  - Safe and convenient opportunities to cross the street
  - Consideration for shade and lighting needs

Travelway Realm

- Defined by the edge of pavement or curb line that traditionally accommodates the travel or parking lanes needed for vehicles in the transportation corridor
- Travelway realm focuses on two objectives:
  - Achieve greater balance between travel modes sharing the corridor
  - Promote human scale for the street and minimize pedestrian crossing distance
- Recommendations focus on modes of travel and medians

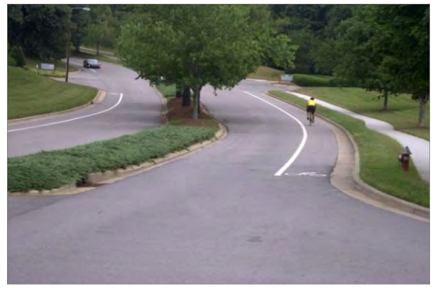
Intersection Realm

- Defined as major intersections within the transportation system, serving multiple travel modes
- Improvements within the intersection realm focus on two areas:
  - Operations
  - Geometric design



Collector Streets

The role of a collector street in a balanced transportation system is to collect traffic from neighborhoods and distribute it to the network of arterials. As such, these streets provide relatively less mobility but higher overall accessibility compared to higher level streets. The lower design speeds and multimodal amenities make these streets attractive for bicyclists and pedestrians. The proper design and spacing of collector streets is critical to serving the future needs of residents and businesses along Raeford Road.



Policy Considerations

The design of the collector street network must respect present and future conditions, the public's vision for the future, and how the network can best balance the natural environment, connectivity, access, mobility, and safety.

Natural Environment

With the network of streams and tributaries that surround Raeford Road, local planners face challenges related to the natural environment. The local geography impacts land use and transportation decisions and affects how the community develops, where streets can be constructed and maintained, and where connections between streets can be made. Collector streets, as part of the development process, must respect the natural environment.

Street Spacing and Access

Local officials must also consider street spacing guidelines that promote the efficient development of an expanding transportation system. Ultimately, these street spacing guidelines could be used as "rules of thumb" during the development review process. Different spacing standards are necessary for different development types and intensities. Understanding this principle, a theoretical model largely influenced by land use intensity ranges shows the desired collector street spacing for different intensities (See **Table 3.4** and the graphics on this page).

Table 3.4 – Collector Street Spacing Standards

Land Use /Type of Collector Street	Intensity (dwelling units per acre)	Access Function	Approximate Street Spacing
Very Low Intensity Residential	Less than 2	High	3,000 to 6,000 feet
Low Intensity Residential	2 to 4	High	1,500 to 3,000 feet
Medium and High Intensity Residential	More than 4	High	750 to 1,500 feet
Activity Center	Mixed-use	Medium	750 to 1,500 feet

In addition to these recommended street spacing standards, individual driveway access to collector streets should be limited to local streets when possible.

Design Elements

As most communities' largest collection of public space, streets need to reflect the values of the community and reinforce a unique "sense of place" to be enjoyed by citizens — whether in urban, suburban, or rural contexts. This is especially true for a collector street system that serves as the backbone for local mobility, property access, and non-vehicular transportation modes. As such, the complete streets concepts examined in this chapter should be considered and incorporated into collector street planning and design. Applying the complete streets concept in collector street planning will help balance the mobility, safety, and aesthetics priorities for the surrounding area.

Future Collector Street Network

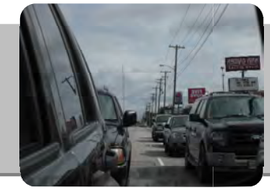
In order to fully address the needs of the Raeford Road corridor, improvements are needed not only to the major arterial, but also to its supporting collector streets. Collector streets are recommended in this area to improve the general connectivity of the regional road network. The collector street system provides critical connections by bridging the gap between arterials and locals and reducing the reliance on the arterial (Raeford Road) for nearly all trips in the vicinity of the corridor.

Recommended collector streets connect some of the key roadways, neighborhoods, and activity centers around the Raeford Road corridor. These proposed collector streets are envisioned to have two lanes and often have exclusive left turn lanes at intersections with principal and minor arterials and less frequently at intersections with other collectors. The actual design of a collector street will depend upon the surrounding land use context. The recommended collector street network is discussed in more detail in **Chapter 4.**

Street Spacing: 3,000' to 6,000'

Street Spacing: 1,500' to 3,000'

Street Spacing: 750' to 1,500'



Bicycle and Pedestrian Planning

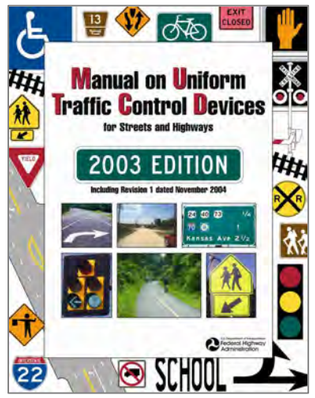
Transportation plans once focused solely on roadway solutions, with planners and local officials concentrating on commuter traffic and travel patterns. Livable communities balance travel between modes by accommodating pedestrians and cyclists for both recreational and utilitarian trips. The increasing demand for bicycle and pedestrian facilities as expressed by the public has culminated in an enhanced focus on these modes during the transportation planning process. This focus includes the background information that follows as well as the multi-modal recommendations in **Chapter 4**.

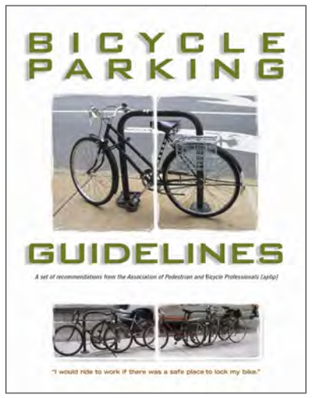
Throughout the nation, densely populated areas turn to cycling and walking as a viable means of transportation. Sometimes commuters find cycling more efficient, affordable, and convenient than traveling by automobile on congested urban streets. Although most people in the United States choose to travel by automobile, cycling and walking remains the only option for some people. Bicycling and walking can be an appealing alternative to traveling by car when considering it:

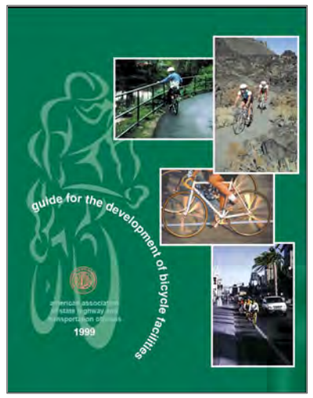
- **Is environmentally-friendly** — A shift from automobile travel to cycling or walking conserves fuel, improves air quality, and reduces noise.
- **Promotes good health practices** — In 2008, the Trust for America's Health reported approximately two-thirds of adults are either overweight or obese. At 29.4%, the same source placed North Carolina 10th in the nation in its list of states with the highest percentage of obese adults. The United States Surgeon General advises Americans to get 30 to 60 minutes of exercise 4 to 6 times per week. Bicycling and walking are low-impact ways to exercise and can improve a person's health by lowering blood pressure, strengthening muscles, lowering stress levels, burning fat, increasing metabolism, and increasing the size, strength, and efficiency of the heart and cardiovascular system.
- **Saves money** — According to the *Consumer Expenditures Annual Report* conducted by the Bureau of Labor Statistics, typical American households in 2007 spent an average of $8,758 on transportation costs, including insurance, repair, maintenance, fuel costs, taxes, and other fees — a significant annual investment. The average cyclist spends only $120 per year on bicycle costs. Choosing to ride a bicycle rather than to use a personal automobile could save one person thousands of dollars in a single year.
- **Eases congestion** — Since a bicyclist takes up about a quarter of the physical space of the average car and a pedestrian even less, both can maneuver more easily through traffic in urban areas. Often, cyclists and pedestrians can use dedicated bicycle lanes, greenways or sidewalks, allowing for an even more efficient trip.
- **Represents the "livability" of a place** — A bikeable and walkable place protects the environment, encourages a healthy, active community, saves money, and increases the mobility of all users. This adds up to a livable community with strong social interaction.
- **Can be viable** — According to a 1995 National Personal Transportation Survey, analysts found that approximately 40% of all trips are less than 2 miles from origin to destination. The average person can make this trip by bicycle in about 10 minutes.

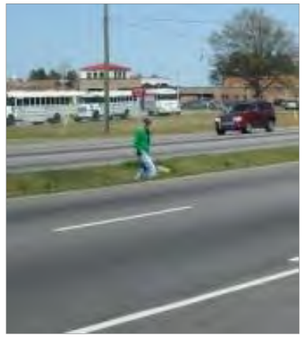
Despite these benefits, the transition from potential use of non-motorized transportation to its reality is not easy. Throughout the public involvement process for the *Raeford Road Corridor Study*, residents noted a need for improved bicycle and pedestrian facilities along the corridor, in an effort to serve students from nearby schools as well as residential and commercial development. The Bicycle and Pedestrian Planning toolbox presents an overview of users and facilities as well as programs and policies available to local officials. The bicycle and pedestrian recommendations presented in **Chapter 4** build on these tools.

A variety of resources are available to guide the design of on-street bicycle facilities as well as ancillary facilities and amenities.












Users and Facilities

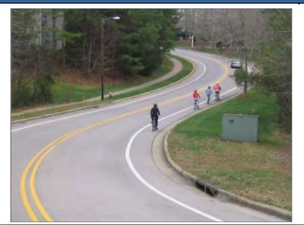
In order to develop and integrate the recommended bicycle and pedestrian network into the overarching vision for the transportation system, the types of users, facilities, and programs must be understood. For bicycling, the most effective set of recommendations addresses the needs and expectations of all advanced, basic adult, and child bicyclists.

- **Advanced —** Usually the most experienced on the road, advanced cyclists have the ability to safely ride in typical arterial conditions of higher traffic volume and speeds. Most advanced cyclists prefer shared roadways in lieu of striped bike lanes and paths, but may be more willing to accept striped bike lanes when the street gutter is cleaned regularly. Although this group represents approximately 20% of all cyclists, they account for nearly 80% of annual bicycle miles traveled.
- **Basic Adult** — Due to being less secure in their ability to ride in traffic without special accommodations, basic cyclists are casual or new adult/teenage riders who typically prefer multi-use paths or bike lanes. Such facilities reduce basic cyclists' exposure to fast-moving and heavy traffic. Surveys of the cycling public indicate that about 80% of cyclists can be categorized as basic cyclists.
- **Child Bicyclists** — The children on bicycles that make up this group have a limited field of vision while riding and generally keep to neighborhood streets, sidewalks, and multi-use paths. Near busier streets, this group is likely to stay on sidewalks or off-street facilities that protect them from traffic. While in general riding on sidewalks should be discouraged, the comfort level of child and basic cyclists may warrant riding on sidewalks provided they yield to pedestrians.

Like drivers, cyclists gain experience over time by riding. As cyclists ride and become more comfortable operating in traffic, they graduate from basic to advanced cyclists. This transition ensures that the needs of all three types of cyclists must be constantly evaluated and accommodated. Roadways need to be designed with an eye toward both the intended use by cyclists and pedestrians and how the facility fits into a system-wide network. **Table 3.5** summarizes the major bicycle and pedestrian facilities.

Design considerations should also be given to ancillary bicycle facilities and amenities such as bike racks, bikes on buses and bike amenities at transit stops, and bike-friendly drainage inlets. For pedestrians, attention must be given to curb ramps as well as marked crosswalks and enhancements such as raised crosswalks, pedestrian refuge island, and curb extensions.

Table 3.5 Bicycle and Pedestrian Facility Overview

Striped Bike Lanes **Description** ▪ Exclusive-use area adjacent to the outer most travel lane ▪ Typical width: 4' to 5'		**Target User** ▪ Basic and Intermediate Cyclists **Estimated Cost** ▪ $18,000 per mile (striping only)
Wide Outside Lane **Description** ▪ Extra width in outermost travel lane ▪ Best on roadways with speed limits of 35 mph or higher and moderate to high daily traffic volumes ▪ Typical width: 14' outside lane preferred		**Target User** ▪ Advanced Cyclists **Estimated Cost** ▪ $18,000 per mile (striping only)
Multi-Use Path **Description** ▪ Separated from traffic and located in open space (greenway) or adjacent to road with more setback and width than sidewalks (sidepath) ▪ Typical width: 10' preferred; 8' in constrained areas		**Target User** ▪ All Cyclists; Pedestrians **Estimated Cost** ▪ $600,000 per mile (includes clearing, grubbing, grading, and construction)
Sidewalk **Description** ▪ Dedicated space within right-of-way for pedestrians ▪ Should include a landscaped buffer from roadway ▪ Typical width: 5' preferred		**Target User** ▪ Pedestrians **Estimated Cost** ▪ $150,000 per mile
Unpaved Trail **Description** ▪ Formal/informal hiking trail made of dirt, mulch, or pea gravel ▪ Typically connects recreational and environmental features of a community ▪ Typical width: 5-8' footpath; 8-10' bike trail		**Target User** ▪ Off-Road Cyclists; Pedestrians; Hikers **Estimated Cost** ▪ $10,000 to $20,000 per mile



Programs and Policies

The friendliest areas for bicyclists and pedestrians balance the Five E's — Engineering, Education, Encouragement, Enforcement, and Evaluation. The facilities described above must be supplemented with coordinated programs and policies that instruct and encourage bicyclists and pedestrians in the full and proper use of the non-motorized transportation network.

Engineering

Engineering refers to the network of pathways that must be planned, designed, and constructed. A well-planned bicycle and pedestrian system can enhance user safety and enjoyment and may increase the attraction of each mode. Bicycle and pedestrian facility projects can be divided into two types: independent and incidental projects. Independent projects are separate from scheduled highway projects, while incidental projects are constructed as a part of a highway project. A combination of both types of projects is necessary to develop a well-connected and user-friendly network. The bicycle and pedestrian facilities recommended as part of this plan are discussed in **Chapter 4**.

Education

Once the pathways are in place, new and experienced cyclists and pedestrians must be made aware of their locations and the destinations that can be reached by using them. Bicyclists, pedestrians, and motorists must be educated on the "rules of the road" to ensure everyone's safety while operating on and adjacent to the bicycle and pedestrian facilities. Education programs can be initiated from a variety of sources. Local governments can host workshops and bike rodeos, law enforcement officers can launch school-based education programs, and local advocacy groups can distribute educational materials.

Encouragement

People need to be encouraged to bicycle and walk. Encouragement should become easier as the network of pathways on and surrounding the Raeford Road corridor make the area more bicycle and pedestrian friendly. Encouragement becomes more critical as these facilities are constructed to justify the investment. Popular encouragement programs include Safe Routes to School, Walk/Bike to School Days, Bicycle to Work Week, Bicycle Rodeos, and Bicycle Mentor Programs.

Enforcement

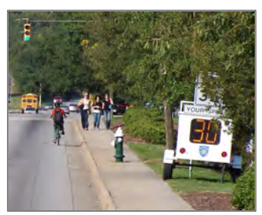
To ensure the safety of all users and the long-term sustainability of the bicycle and pedestrian system, the formal and informal "rules of the road" must be heeded by all. Effective enforcement programs ensure consistent enforcement of traffic laws affecting motorists and bicyclists. These programs include bicycle licensing/registration efforts and positive reinforcement programs implemented by local law enforcement.

Evaluation

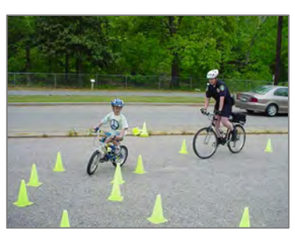
Though often overlooked, evaluation is a critical component of bicycle and pedestrian planning. The friendliest communities for cyclists and pedestrians have a system in place to assess existing programs and outline steps for future expansion.

Bicycle and Pedestrian Element

The Bicycle and Pedestrian Element presented in **Chapter 4** focuses on a system of routes on and around the Raeford Road corridor. It should be noted that the inclusion of bicycle and pedestrian facilities on upgrades of existing roadways and newly constructed roadways will contribute to friendliness of the study area to bicyclists and pedestrians.








Transit Planning

Within the context of the transportation system, transit has two overarching objectives. First, transit expands the reach of those without access to other means of travel. Second, transit provides viable transportation alternatives to decrease dependence on the automobile and in-turn lessens the demand on the existing transportation system. The idea is to create a transportation system whose primary motive is to move people rather than cars. One way to encourage transit use on existing routes is to ensure that each stop has a safe, comfortable customer delivery system with attractive and convenient amenities. Since most regular transit users walk or bike to and from the stop, a network of sidewalks, safe street crossings, bike facilities, multi-use paths, and pedestrian-level lighting should accompany the amenities provided at the stop. The efficiency of transit also depends on an interconnected system of roads and highways that provide access to transit stops.

The idea is to create a transportation system whose primary motive is to move people rather than cars.

Transit is a mode of transportation which cannot be considered in isolation. The information presented here and the strategies presented in Chapter 4 also support improvements to the larger transportation system that aim to move the region's citizens safely and conveniently between destinations.

Transit and Urban Form

Many people agree that they would use transit if service was fast, frequent, dependable, and easy to use. While such criteria are required of the entire transportation network, transit also must provide connections to the places people need or want to go at a time when they need to get there. As a result, transit enhancements must occur within a framework of transit-supportive urban form. Two development types that maximize potential transit ridership include transit-oriented development and transit-ready development.

Transit-oriented developments (TODs) provide a mixture of residential and commercial uses focused around transit stations or bus stops. The transit stop is surrounded by relatively high density development that spreads out as you move away from the center. The scale of a TOD generally is limited to an area ¼- to ½-mile in diameter to establish the walkability of the neighborhood. This design maximizes access to transit and supports walking and biking between destinations. In locations that lack existing transit facilities or demand to support a TOD, regulations and guidelines supporting transit-ready development should be enforced. Transit-ready development describes the coordinated design of new neighborhoods and activity centers that supports future transit expansion, and exhibits many of the same characteristics of a TOD.

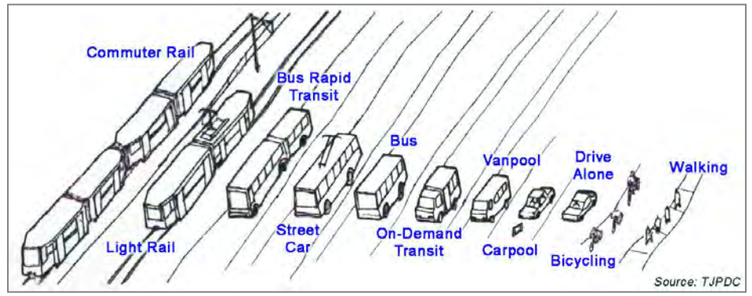
Transit-Oriented Development

While transit-oriented and transit-ready developments represent ideal urban form for transit destinations, many existing single-use locations along the Raeford Road corridor are viable long-term facilities for transit service. Shopping centers, grocery stores, and business parks are just a few examples of vital destinations for many residents. Likewise, visitors may use transit to frequent local parks and historic sites. While the urban design of such places may not be ideal for transit, these locations are places where access to public transportation continues to be an important priority.

Transit Technologies

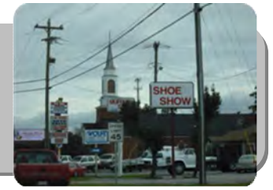
A sustainable transit system results from a plan that identifies strategic corridors for transit as well as the proper technology as determined by land use conditions and ridership trends. Often, successful plans allow the system to mature by laying the groundwork with simpler, more cost-effective technology such as shuttles or buses and as demand increases implementing more extensive technology. Some of these strategies include:

A range of transportation options should be made available, including different types of transit.



- **Paratransit and Other Services** — Paratransit systems provide critical dial-a-ride (on-demand) services to persons with disabilities, the elderly, and others who do not live near a fixed bus route. Other services include neighborhood shuttles, employment center shuttles, Special Transportation Services, and vanpool and carpool services.
- **Buses** — Local fixed route bus networks are the workhorses of many transit systems. Buses operating on local streets with curbside bus stops provide a flexible transit technology capable of responding to the evolution of land use types and intensities.
- **Trolleys** — These modern interpretations of the 20th century streetcar are smaller and lighter than LRT vehicles. Trolleys operate similar to buses (in terms of frequent stops along the street) but can hold more passengers than the typical bus.
- **Light Rail Transit (LRT)** — These overhead electric powered lightweight trains typically operate in exclusive rights-of-way but also can mix with traffic. Transit stations can be spaced as close as one mile apart.
- **Bus Rapid Transit (BRT)** — Like LRT, bus rapid transit vehicles can operate on exclusive rights-of-way (busways) or travel through neighborhoods to serve passengers at local stops. On-line stations and off-vehicle ticketing combined with the busways create fast, convenient service.
- **Commuter Rail** — This service provides scheduled service along railroad tracks, typically between a city center and its suburbs. Service often is limited to peak hour and shares the rail with other passenger or freight rail providers.





CHAPTER 4 – RECOMMENDATIONS

This chapter summarizes recommendations along Raeford Road, including high-level planning strategies for the outlying study area and specific design improvements within the travelway. The chapter begins with planning-level strategies and recommendations for bicycle and pedestrian improvements, transit enhancements, and intelligent transportation system upgrades. Corridor specific recommendations follow and include specific access management strategies as well as intersection and corridor improvements. The chapter concludes with a summary of how these recommendations potentially could impact traffic and safety along the corridor.

Recommendations Development Process

The development of recommendations for the ***Raeford Road Corridor Study*** was an iterative process that included input from numerous stakeholders, policy makers, business owners, and the general public. Generally, recommendations are based on input from the community and stakeholders and vetted by the project team to ensure they efficiently address existing problems and create a sustainable future for the corridor and the Fayetteville community. Chapter 1 details the planning process undertaken to establish a vision for the corridor and develop recommendations.

The community-wide survey was the initial step and helped identify existing issues, problem areas, and the community's appetite for potential improvements. The second step introduced the project to the local business community through the stakeholder symposium (held March 15, 2010). At the stakeholder symposium, business owners, elected officials, and emergency service officials worked through project issues and provided insight on potential improvements. Following these events, the project team reached out to the Fayetteville community through the first public workshop (held March 31, 2010). Citizens voiced their opinion of existing issues and potential improvements. This event was well-attended and set the stage for the development of community and corridor recommendations.

Following these public outreach events, the Raeford Road Advisory Committee participated in a project work session to vet the identified issues and recommendations. The result was an initial preferred access plan and corridor specific improvement ideas. The project team then evaluated the operational efficiency and feasibility of the recommendations. At the end of this process, the first set of conceptual design plans and planning level recommendations were developed and presented to the Advisory Committee for review.

The final step in the recommendations development process was to present the proposed improvements to the public. The second public workshop (held June 22, 2010) allowed the community to view the recommendations and provide comments to the project team and the Advisory Committee. The recommendations that follow are a result of this iterative process and represent a community-driven approach to improving the Raeford Road corridor.

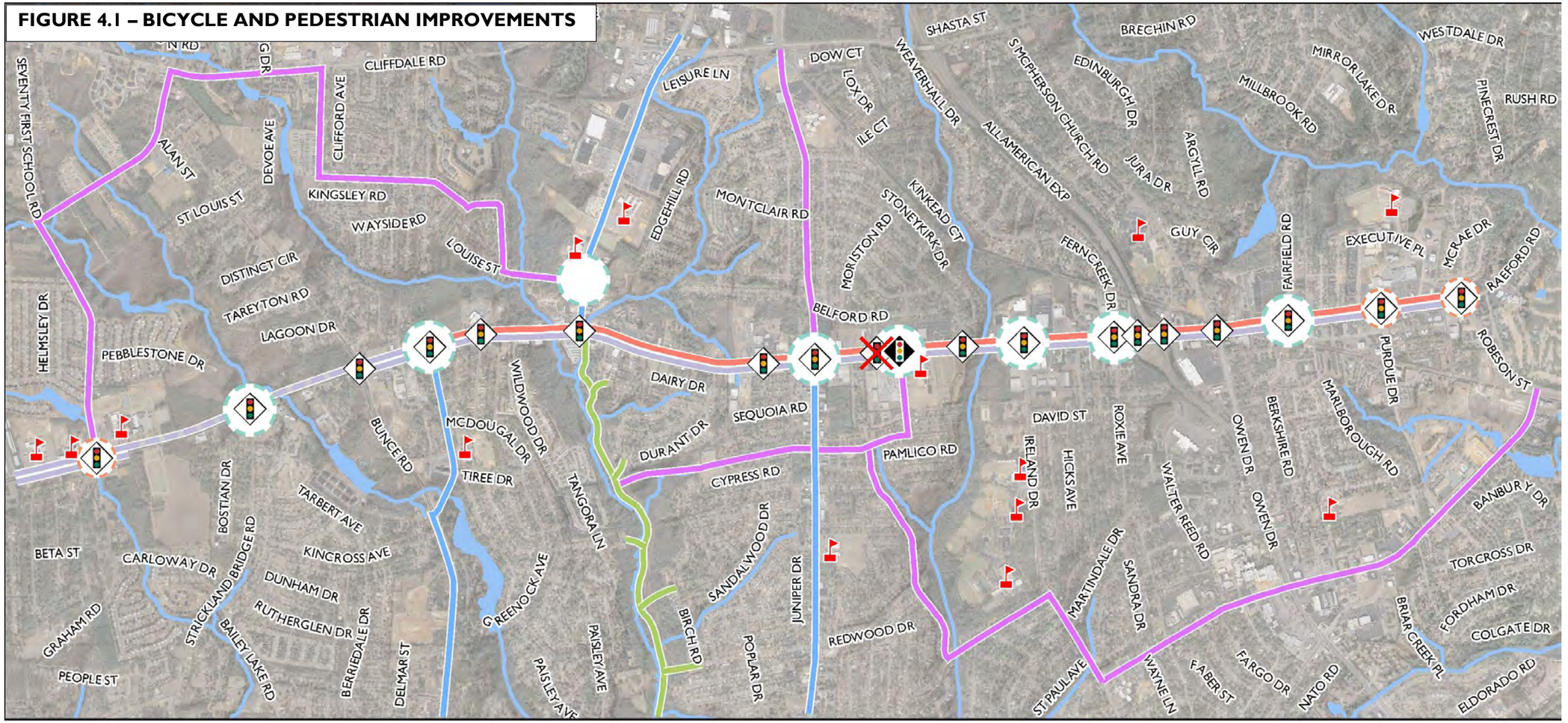
Scenes from the Recommendation Development Process







FIGURE 4.1 – BICYCLE AND PEDESTRIAN IMPROVEMENTS



Legend

- Existing Sidewalk
- Proposed Sidewalk (Short Term)
- Proposed Sidewalk (Long Term)
- Improve Existing Crossing
- New Pedestrian Crossing
- Proposed Bike Route
- Existing Bike Route
- Proposed Greenway
- Body of Water
- Existing Signal
- New Signal
- Remove Signal

0.5 0.25 0 0.5 1 Miles

N



Bicycle and Pedestrian Improvements

The current bicycle and pedestrian network along Raeford Road is not exactly adequate for a sustained level of riding or walking. Sidewalks exist along a portion of the corridor, but their location directly behind the face of curb does not promote safe pedestrian passage. Additionally, only a handful of designated pedestrian crossings exist, which limits the ability of the pedestrian to fully utilize the corridor. Despite the limitations in the network, pedestrian use prevails along the corridor as evidenced by worn foot paths on the south side of the roadway. Traffic volumes and speeds make bicycle use very prohibitive along the corridor.

Planning-level recommendations (**Figure 4.1)** were developed for the bicycle and pedestrian realms. The recommendations generally complete portions of the system already in place while providing alternative routing for those citizens interested in non-vehicular trips. For pedestrians, the high level of commercial activity and residences along and near the corridor supports the need for better walkability than currently provided. Today, a continuous section of sidewalk on the northern side of Raeford Road is located between Bingham Drive and Robeson Street. The sidewalk connects numerous commercial businesses on the northern side of the road, but the lack of crosswalks isolates the southern side.

Proposed sidewalk improvements include extending the existing sidewalk on the northern side of Raeford Road west to Hampton Oaks Drive. The recommendations also include sidewalks along the southern side of Raeford Road between Bunce Road and Robeson Street and between Hampton Oaks Drive and the 71st High School area. In total approximately 5.5 miles of new sidewalk are recommended along the Raeford Road corridor.

The pedestrian recommendations also include crosswalks and pedestrian signals at eight locations and improving existing crosswalks at three locations. The crosswalk areas should include high visibility crosswalk markings, pedestrian signal heads with countdowns, and push button activation for pedestrian light engagement. The graphic to the right provides a typical intersection configuration, while the image below shows a typical pedestrian crossing signal.

Table 5.1 – Proposed Crosswalk Improvements along Raeford Road

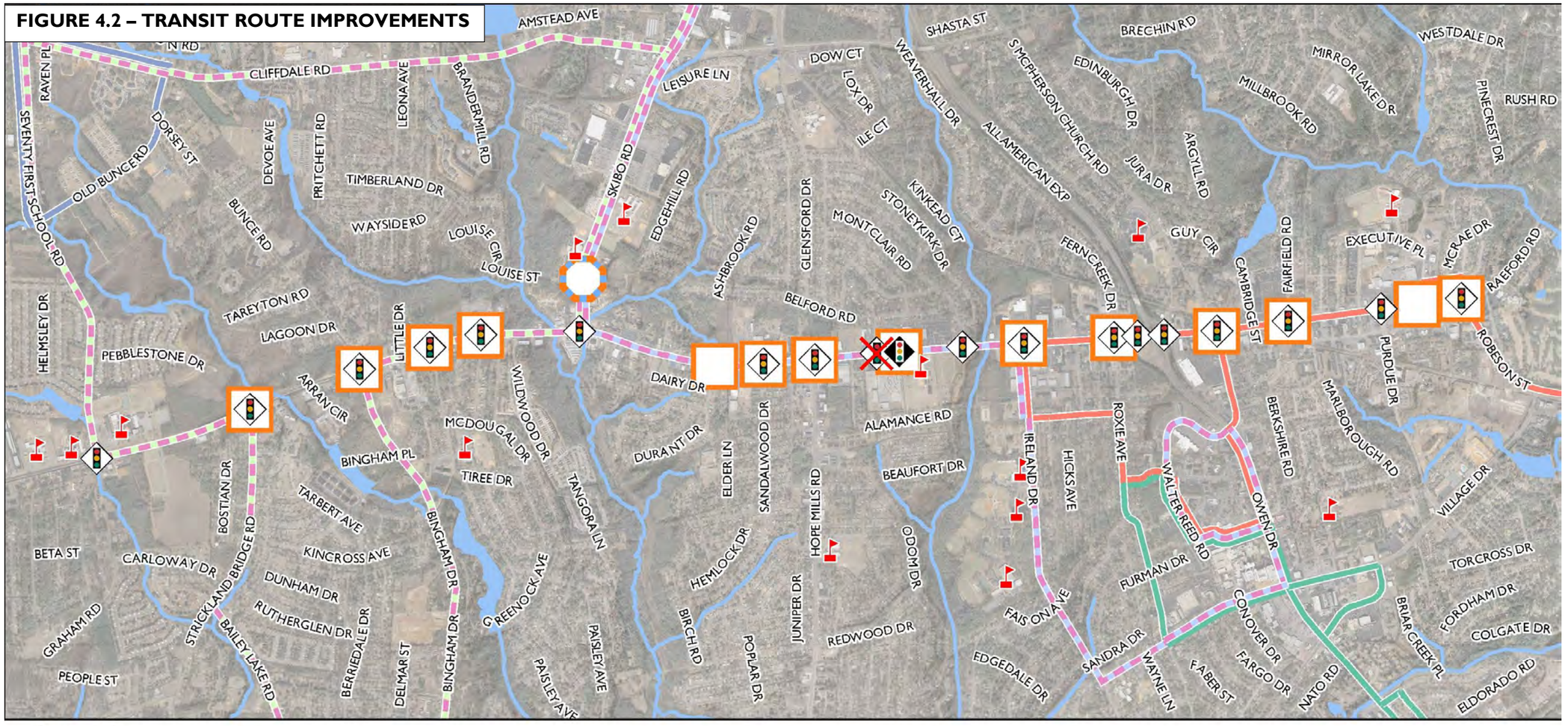
New Crosswalks	Existing Crosswalk Improvements
Strickland Bridge Road and Raeford Road	71st School Road and Raeford Road
Bingham Drive and Raeford Road	Purdue Drive and Raeford Road
Skibo Road and Louise Street (*FAST* Transfer Station)	Robeson Street and Raeford Road
Hope Mills Road and Raeford Road	
Scotland Drive and Raeford Road	
Ireland Drive and Raeford Road	
Roxie Avenue and Raeford Road	
Fairfield Road and Raeford Road	

The main focus for bicycle improvements was to provide alternative routes. The use of Raeford Road as a bicycle facility is not ideal, given the speeds and volumes of traffic. As an alternative, parallel bicycle routes are proposed along some of the lower volume streets adjacent to Raeford Road. A southern bike route follows Village Drive, portions of Ireland Drive, Coventry Road, Odom Drive, Watauga Road, and connects to Raeford Road via Scotland Drive (which is proposed to be signalized). To the north, the bicycle routes follow the Glensford Drive extension, Louise Street, Timberland Drive, Pritchett Road, a portion of Cliffdale Road, Bunce Road, and 71st School Road.

In addition to the proposed bicycle routes, a greenway connection is proposed adjacent to Beaver Creek south of Raeford Road. The worn trail that currently exists in this area that would benefit from a cosmetic and infrastructure upgrade. A ten foot wide multi-use path would provide an additional open area along the corridor and allow non-vehicular access to and from numerous neighborhood connections in the area. The proposed greenway would tie-in to the Raeford Road and Skibo Road intersection, allowing cyclists and pedestrians to access the proposed sidewalk network along Raeford Road.



FIGURE 4.2 – TRANSIT ROUTE IMPROVEMENTS



Legend

- Route 7
- Route 8
- Route 16
- Route 15 (Old Route 15 East)
- Route 18 (Old Route 15 West)
- Bus Pullouts
- Transfer Station*
- Body of Water
- Existing Signal
- New Signal
- Remove Signal

0.5 0.25 0 0.5 1 Miles

N

*Bus transfer between Route 15 and Route 18 - includes shelter, benches, pedestrian crosswalks, and pedestrian signal



Transit Improvements

The existing transit system serves the majority of Raeford Road, but the system has noticeable gaps. West of Bunce Road toward the 71st School area lacks transit service. Additionally, the section of Raeford Road between Hope Mills Road and Ireland Drive does not have consistent transit service. The proposed transit recommendations fill these gaps and provide more complete transit service for the length of this busy commercial corridor.

The transit improvements (**Figure 4.2**) are based on recommendations found in the *City of Fayetteville Transit Development Plan* and conversations with Fayetteville Area System of Transit (FAST) staff. The two sources provided a consistent message, including:

- The need to split existing Route 15 because it is too long and circuitous
- The desire to re-route some of the current routes out of neighborhoods because of low ridership in those areas
- The desire to incrementally extend service west for better coverage throughout the city

With these criteria, the project team evaluated recommendations outlined in the *Transit Development Plan* and forwarded planning-level recommendations for route changes and major bus stop modifications along Raeford Road. Currently four routes serve the Raeford Road study area.

- **Route 7** serves the eastern portion of the corridor and provides access to downtown Fayetteville. No modifications are recommended for this route.
- **Route 8** serves the Cape Fear Valley Medical Center and points south of the corridor via Owen Drive. No changes are recommended for this route.
- **Route 16** serves neighborhoods along Old Bunce Road north of the corridor via 71st School Road. No changes are recommended for this route.
- **Route 15** serves the central and western portions of Raeford Road, providing circuitous access between the Cape Fear Valley Medical Center and the mall. This route is recommended to be split.

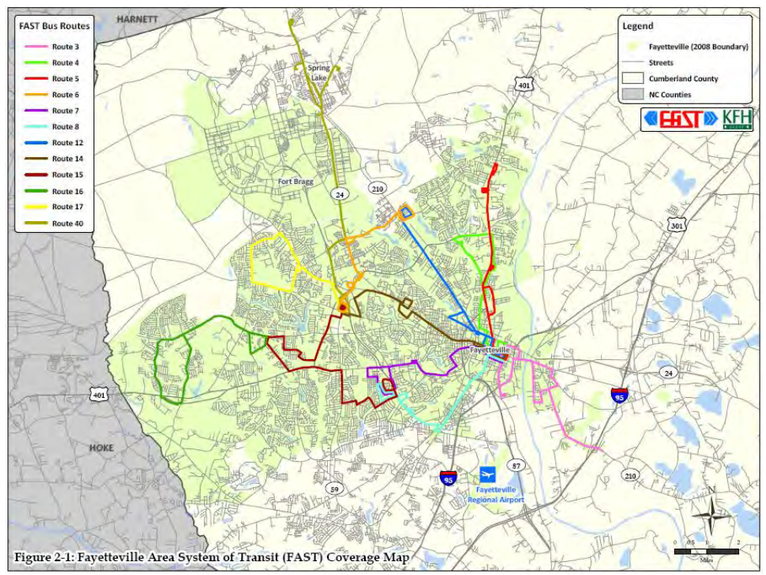
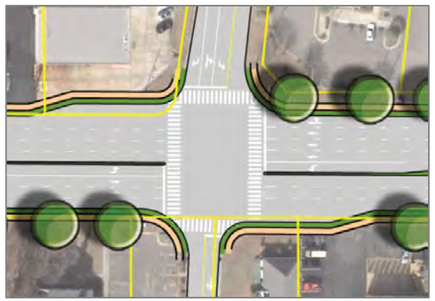


Figure 2-1: Fayetteville Area System of Transit (FAST) Coverage Map

The recommendation to split Route 15 is mostly consistent with the recommendations in the *Transit Development Plan*, which recommended the split because the existing route is the third most expensive to operate systemwide but also is in the bottom third in terms of productivity. In addition, the eastern portion of the route winds through neighborhoods that don't provide many riders. The *Transit Development Plan* called for the route to be split into two, with one vehicle for each route. The split route will provide a more direct connection between the mall and the hospital.

The recommendation of the ***Raeford Road Corridor Study*** slightly differs from the *Transit Development Plan*. Splitting the route will create an eastern (Revised Route 15) and western route (New Route 18). The ***Raeford Road Corridor Study*** supports Option #1 for the Revised Route 15, which utilizes Ireland Drive to reach the Cape Fear Valley Medical Center rather than the circuitous neighborhood routing. For the New Route 18, the project team (with collaboration from FAST) determined the route should provide complete coverage along the Raeford Road corridor, including a western segment that reaches 71st School Road. Figure 4.2 on the previous page illustrates the proposed route, designated as Route 18. These routes will meet at a transfer station on Skibo Road, as described below.

In addition to routing changes, this ***Raeford Road Corridor Study*** also recommends strategic bus pull-out lanes along Raeford Road. This action moves stopped buses from the travel lane, which should increase traffic flow and reduce congestion and crashes related to bus loading and unloading. This cause of congestion was brought up numerous times by residents in both the public outreach and community survey process. Bus pullouts are recommended at 15 locations along Raeford Road. These pull-out lanes should be located on the opposing side of the intersection, allowing both bus traffic and u-turn operations at signals. An example of bus pullouts is shown to the right.



A transfer station also is recommended at Skibo Road and Louise Street to accommodate passenger movement between Routes 15 and 18. The transfer station should include bus stop shelters and seating, a pedestrian cross walk with signal, and bus pull-outs for bus loading and unloading. Typical bus stop shelter and access designs are shown in the image to the right.

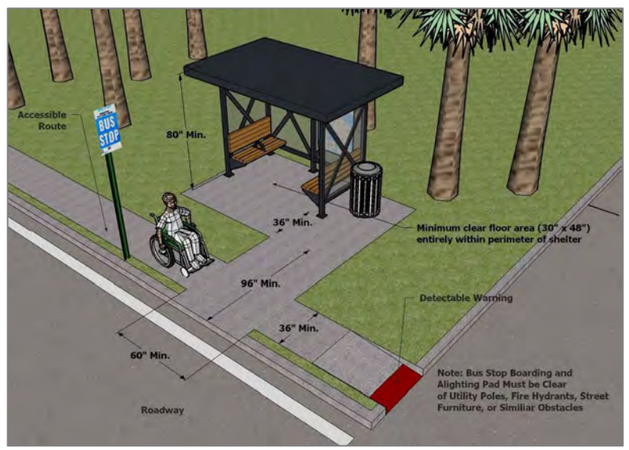
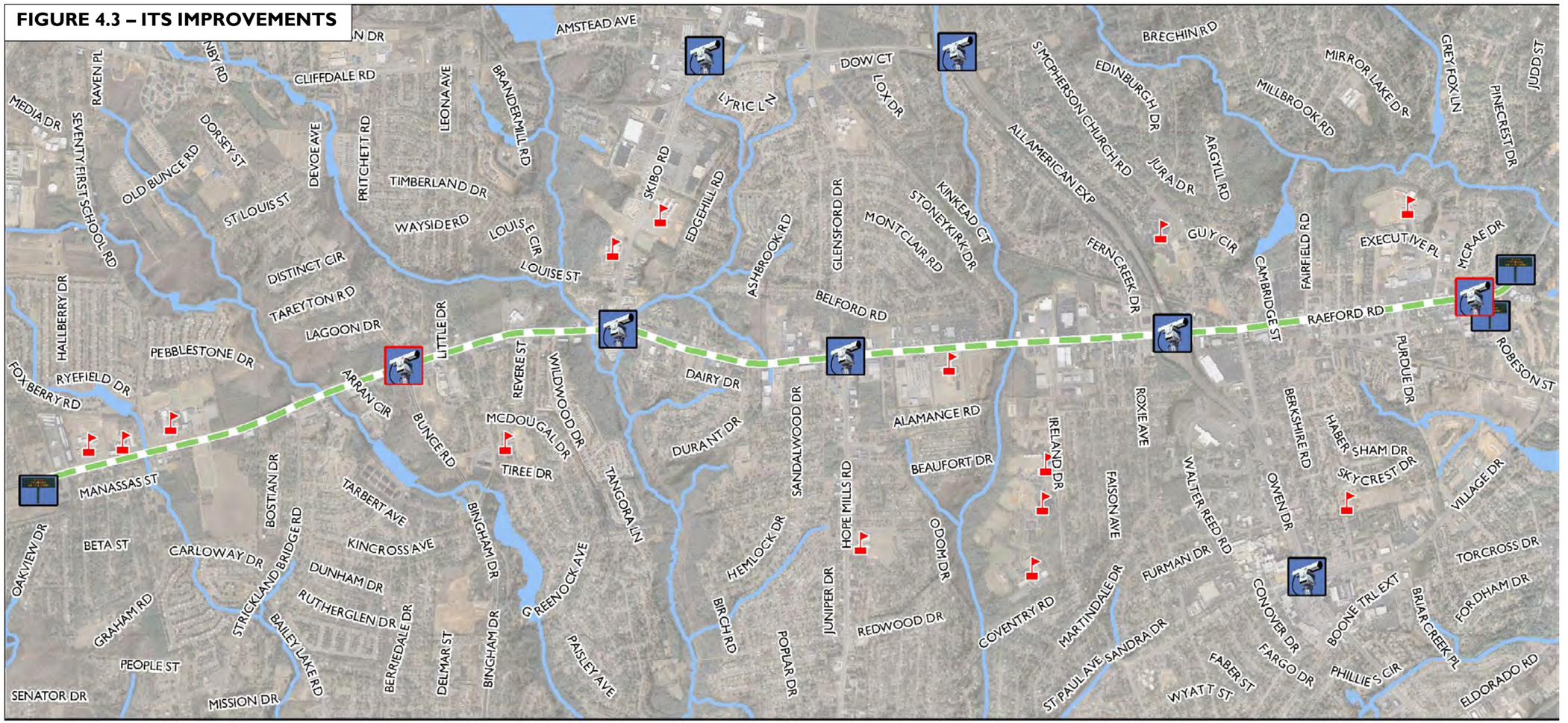




FIGURE 4.3 – ITS IMPROVEMENTS



Legend

- Existing Closed Circuit Television
- Proposed Closed Circuit Television
- Proposed Dynamic Message Sign
- Proposed Fiber Optic Cable Route
- Body of Water

0.5 0.25 0 0.5 1 Miles

N

Kimley-Horn and Associates, Inc.



Intelligent Transportation System Improvements

Given the high levels of congestion and number of crashes along the corridor, discussions during the project included the need for advanced warning to motorists before they experience long delays and queuing. Typically, this type of advanced warning system utilizes components of Intelligent Transportation Systems (ITS) to monitor traffic, report issues, and provide basic information (e.g. delay/wait time or alternative routing) to the motorists. This study recommends a combination of Closed Circuit Televisions and Dynamic Message Signs to provide that feedback loop and advanced information system. This recommendation essentially responds to the total delay caused by the number of crashes along the corridor. According to NCDOT, the average response and clean-up time for a vehicular crash in the state is about 50 minutes. When projected over approximately 2,500 crashes that occurred along the Raeford Road corridor over the past five years, the total delay due to traffic crashes is just over 85 days.

The ITS recommendation commonly is referred to as an Advanced Traveler Warning System. The general concept is to allow city traffic engineers to monitor safety and congestion through closed circuit televisions (CCTV) cameras that provide live feeds of roadway conditions for specific intersections or segments of the corridor. The CCTV cameras are pole mounted and can be rotated to view traffic conditions up to two miles away, given adequate vertical clearance and sight conditions. As incidents or congestion occurs, travel time information or alternative routing can be uploaded to dynamic message signs (DMS) located along the periphery of the corridor.

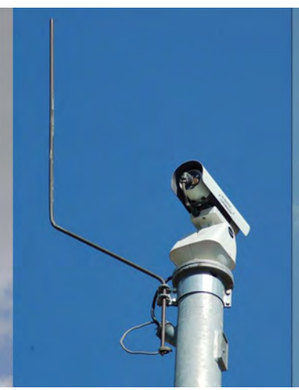
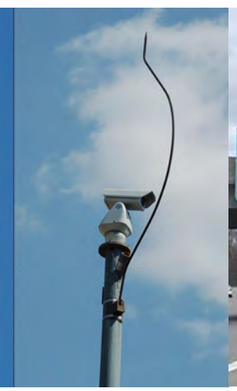
The recommendations for this study utilize existing infrastructure, including three CCTV cameras along the corridor and three more adjacent to the corridor. Two new CCTV cameras are recommended at the Raeford Road intersections with Bunce Road and Robeson Street. Currently, no DMS signs exist along the corridor. The installation of three new dynamic message signs: (1) on the northbound Robeson Street approach to Raeford Road, (2) on the westbound Raeford Road approach near Robeson Street, and (3) on the eastbound Raeford Road approach near 71st School Road. The dynamic message signs primarily would be used to alert motorists of incidents or congestion. The signs also could post travel times during non-incident periods or post community-wide messages or information.

According to NCDOT, the average response and clean-up time for a vehicular crash in the state is about 50 minutes. When projected over approximately 2,500 crashes that occurred along the Raeford Road corridor over the past five years, the total delay due to traffic crashes is just over 85 days.

Table 5.2 – ITS Infrastructure Recommendations

Existing*	Proposed
Closed Circuit Television Cameras	
Raeford Road at Skibo Road	Raeford Road at Bunce Road
Raeford Road at Hope Mills Road	Raeford Road at Robeson Street
Raeford Road at All American Expressway	
Dynamic Message Signs	
	Raeford Road at 71st School Road (eastbound)
	Raeford Road at Robeson Street (westbound)
	Robeson Street at Raeford Road (northbound)

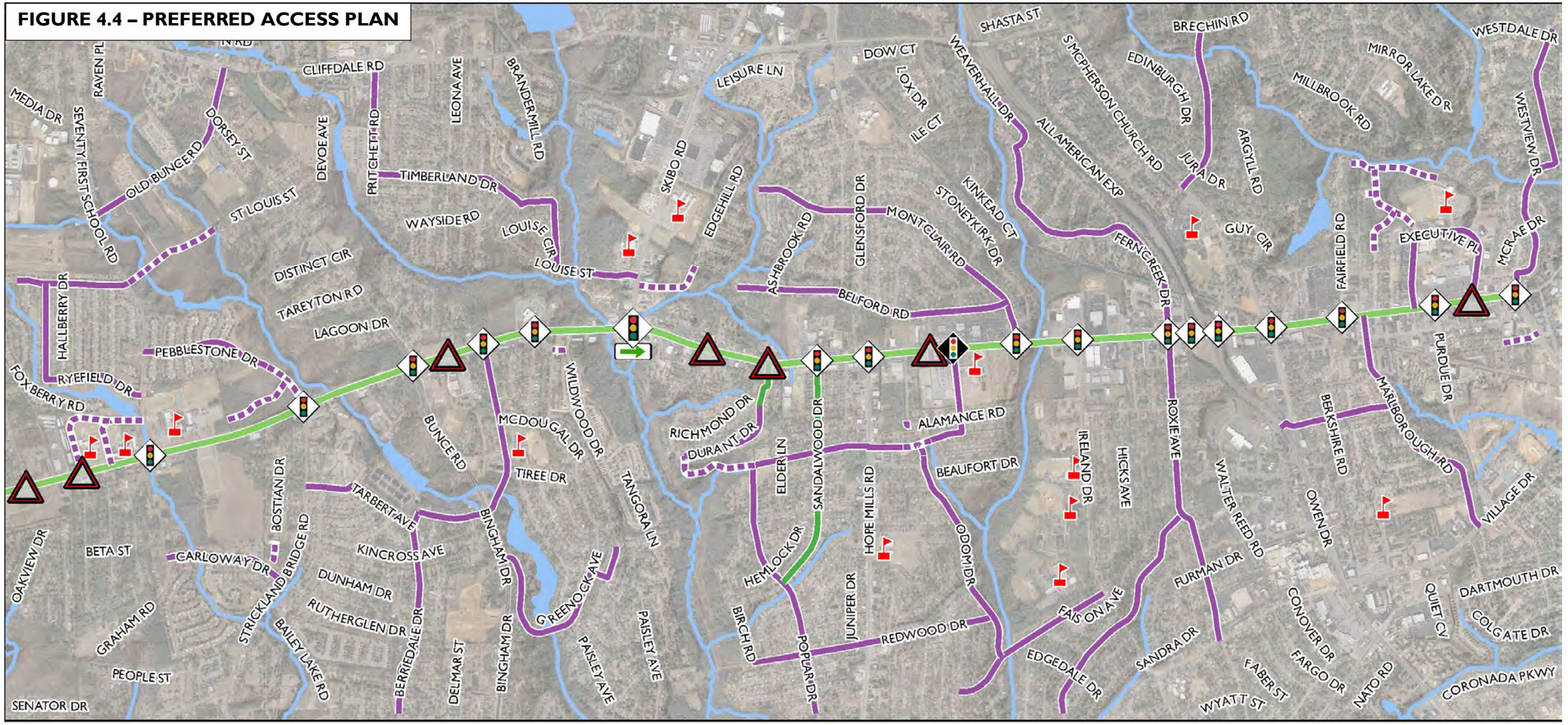
**DMS adjacent to the corridor are located at Skibo Road/Cliffdale Road, All American Expressway/Cliffdale Road, and Owen Drive/Village Drive*


Examples of pole-mounted closed circuit television cameras and dynamic message signs



FIGURE 4.4 – PREFERRED ACCESS PLAN



Legend

Existing Signal
New Signal
GreenT
Proposed Leftover
Proposed Median

Collector Streets
FAMPO 2035 LRTP Alignments
Existing Alignments for Designation
Proposed New Alignment

Body of Water
School

0.5 0.25 0 0.5 1 Miles



Preferred Access Plan

Figure 4.4 illustrates the corridor wide preferred access plan. The preferred access plan provides the planning-level access management recommendations for the entire corridor, including medians, signals, and other median openings. The preferred access plan is the primary planning tool to evaluate community-wide access decisions along Raeford Road. The development of the preferred access plan was the first step in the creation of a conceptual design for the corridor. Before developing the preferred access plan, a set of spacing guidelines were developed specific to the Raeford Road corridor, primarily from NCDOT and City of Fayetteville guidelines. The spacing standards used to develop the preferred access plan and the overall corridor recommendations were 800 to 1,200 feet for median openings (with less spacing between openings in the more urban eastern section) and 1,500 feet for signals.

Traffic Signals

In general, no new traffic signals are recommended along the Raeford Road corridor. The only signalization changes are recommended at the Raeford Road intersections with Skibo Road and Brighton Road/Scotland Drive.

- The existing three-leg, three phase signal at Skibo Road is recommended to be converted to a Continuous Green T-intersection. This configuration allows one movement to continuously flow, reducing congestion in that direction and providing more green time to the other movements. This improvement is described further in the following sections.
- The existing signal at Brighton Road is recommended to be relocated to Scotland Drive. This recommendation should only take place after the Glensford Drive extension is complete, which should reduce overall traffic demand at Raeford Road. The relocation of the signal will allow the movement of bus traffic at Owen Elementary, which eliminates the need for the dangerous school crossing movements in the AM and PM peak hours. This improvement is described further in the following sections.

Access Management Improvements

The preferred access plan also guides access management improvements at non-signalized intersections and mid-block segments along the corridor. In general, the access management recommendation is to convert the continuous two-way left turn lane to a plantable median to improve safety and aesthetics along the corridor. The preferred access plan shows the median running the entire length of the corridor, except between Roxie Avenue and South McPherson Church Road near the All American Expressway. This section will remain without a median based on the vehicular storage demands related to turning movements at the interchange.

Left-over treatments are proposed at six locations, with one existing left-over between Bunce Road and Bingham Drive retained as part of this set of recommendations. The six locations are:

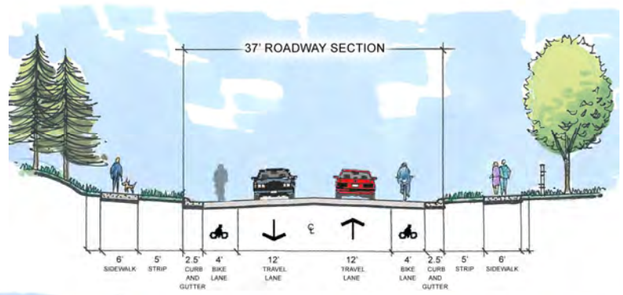
- Hampton Oaks Drive
- The ingress point of a proposed circulator route at Auman Elementary School
- Cindy Drive/Durant Drive (offset leftovers)
- Wildwood Road
- Brighton Road (single direction)
- Executive Drive (single direction)

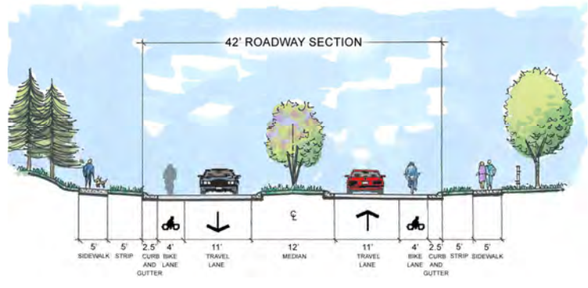
These improvements are described further in the following sections.

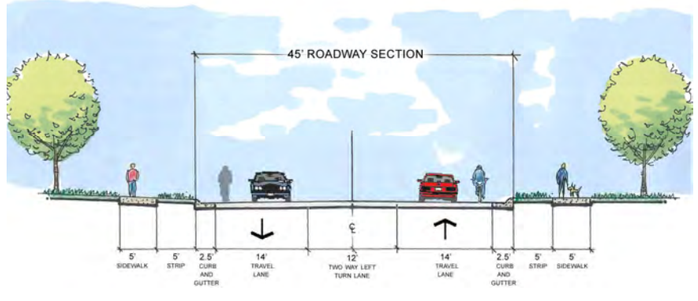
Collector Streets

Figure 4.4 also provides locations for recommended collector streets adjacent to the corridor. Collector street standards, uses, and definitions were provided in Chapter 3 of this report. In general, collector streets are intended to relieve some traffic along a major arterial by providing additional route choices for motorists, primarily from large residential neighborhoods. In situations where a neighborhood might only have one access point along Raeford Road, the project team tried to establish an alternative route, whether along an existing route or a new alignment.

In general 26 miles of collector streets are recommended along the corridor, with 4 miles on new location and 22 miles along existing roadway. The graphics below and to the right provide example typical collector street cross sections.





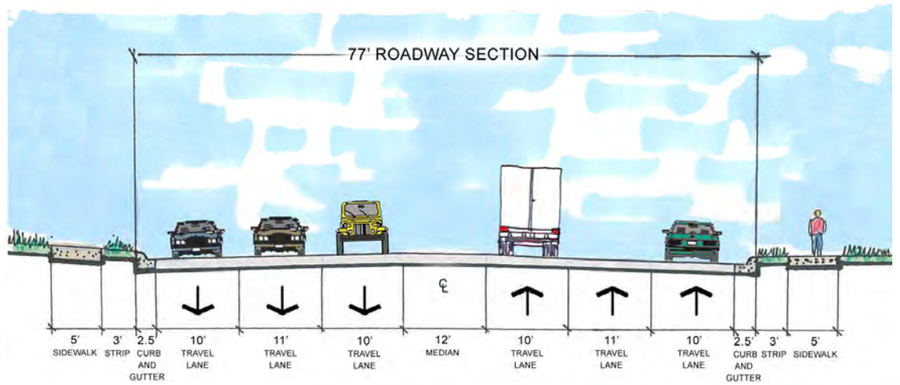




Cross Sections

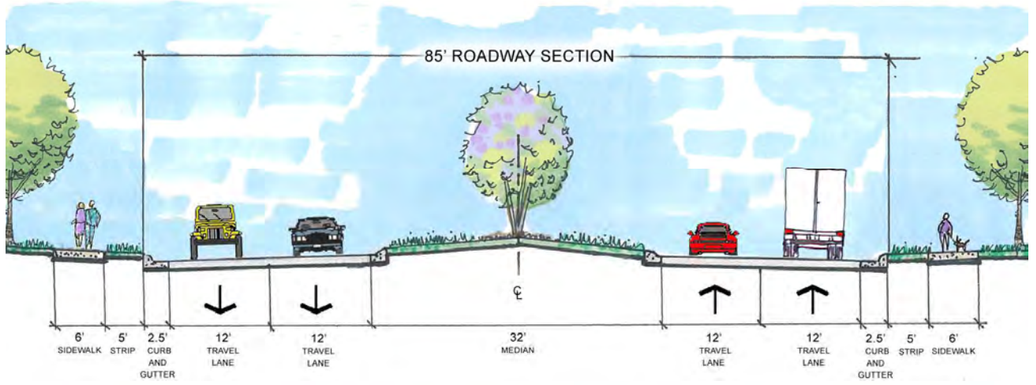
Existing Cross Section

The existing cross section varies along the Raeford Road corridor, with two distinctly different sections in the western and eastern portions of the corridor. The eastern portion typically has seven lanes with the center lane used as a continuous two way left turn lane. The widths of the travel lanes vary throughout the corridor, with ten or eleven foot lanes being typical for most of the roadway. The western portion has a median (with a 32 foot width west of Strickland Bridge Road and a smaller width between Strickland Bridge Road and Bingham Drive) and the travel lanes consistently are twelve feet wide.



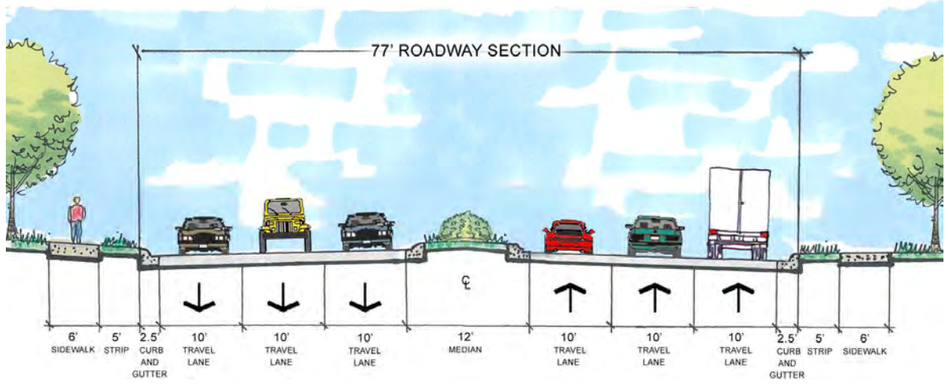
Proposed Cross Section – Western

Based on the recommendations developed by the project team and Advisory Committee, two cross sections are proposed for the future Raeford Road corridor. The first cross section, located in the western portion of the study (west of Strickland Bridge Road) includes a wide median (32') and four twelve foot travel lanes. This section is consistent with the more rural/suburban feel and the higher travel speeds found in this segment. Street trees are proposed in the median and adjacent to the corridor. Sidewalks are recommended along the corridor (consistent with the Bicycle and Pedestrian Recommendations), with a five foot planting strip buffering pedestrians from the travelway.



Proposed Cross Section – Eastern

The second cross section, located in the eastern portions takes a more "context sensitive" approach to median application. A narrower median is proposed to reduce the need to widen the roadway. Given the viability of the businesses along the corridor, it was a common goal of the project team, Advisory Committee, and citizens to limit the amount of widening needed to accomplish the goals of access management. With this in mind, the typical section calls for a twelve foot planted median (limited to small scale shrubbery) with ten foot travel lanes. Street trees are proposed only on the outside of the travelway. Sidewalks are recommended along the corridor (consistent with the Bicycle and Pedestrian Recommendations), with a five foot planting strip buffering pedestrians from the travelway.





Access Management – Conceptual Designs

This section provides more detail about the specific recommendations, including intersection improvements and access management strategies. Each area described is accompanied by a graphic that depicts the proposed improvements. Full corridor improvements can be seen in the Conceptual Design Plans found at the end of this document. The improvements described in this section begin in the western portions of the corridor and progress to the east. If an intersection or segment is not mentioned in this section, it is an indication that the current laneage, geometry, or signalization features were kept in place, with only the inclusion of a median and defined turn lanes and storage as the primary improvement.

Hampton Oaks Drive to Auman Elementary School

The proposed improvements in this section of Raeford Road include leftover access at both Hampton Oaks Drive and Auman Elementary School, with a proposed new circulator route that serves both Auman Elementary School and 71st Middle School. The leftover at Hampton Oaks Drive supports the residential uses to the north and the retail and office uses to the south. The retail and office uses need left and right ingress because of the awkward access through the Food Lion shopping center. Specifically, Rayconda Road on the western part of the site provides adequate access, but the site layout does not lend itself to through traffic. This will be necessary for the fast food and medical office uses located as outparcels on the eastern portions of the site.

Approximately 1,200 feet to the east, a left-over access is proposed for Auman Elementary School ingress movements. This leftover is in response to congestion and stacking related to school bus movements and parental pick-up and drop-off. To create this ingress point and effectively mitigate the drop-off problem, a new circulator route is proposed for the school. The proposed circulator should be one-way, serving only ingress movements from Raeford Road. All outbound egress movements should utilize 71st School Road. A second circulator route is proposed between Auman Elementary and 71st Middle School to capture the drop-off/pick-up demand from the middle school. This circulator could operate with two-way movements and a right-in/right-out access on Raeford Road.

71st School Road

No major geometric or laneage changes are proposed at 71st School Road. The only proposed changes respond to the need for improved pedestrian safety between the schools and the restaurant, retail, and residential uses to the south. Improvements include high visibility crosswalks and pedestrian countdown signal heads. In addition, vegetation and shrubbery placed along the median sections will prevent students from crossing mid-block. The ultimate goal is to direct students to safer crosswalks, rather than more dangerous mid-block crossings.

Strickland Bridge Road

No major geometric or laneage changes are proposed at Strickland Bridge Road, but pedestrian improvements at the intersection are recommended. These improvements include high visibility crosswalks and pedestrian countdown signal heads. This improvement will gain greater precedent when the land north of the intersection develops in the future. In addition to the future pedestrian improvements, alternative access from this new development will be important. A collector street on new location is proposed between Raeford Road and Pebblestone Drive to allow multiple access options for patrons of the new development.



Bunce Road to Bingham Drive

The recent improvements at Bunce Road are relatively new and not intended to change as part of the recommendations of this study. However, the improvements at Bunce Road have not done enough to attract vehicles from Bingham Drive, which was the primary access point from the south in this location prior to these improvements. The recommendations in this section aim to shift major turning movements from the smaller two lane Bingham Drive to the larger Bunce Road.

The first improvement is reducing the number of left-turning lanes from Raeford Road to Bingham Drive from two lanes to one offset lane. The offset left turn is in response to the lane drop at this intersection and the prevailing driver confusion that results from the drop. By offsetting the left turn lane, the presence of the lane drop should become more apparent to approaching motorists.

After reducing the number of left-turn lanes from two to one, the number of receiving lanes on Bingham Drive can be reduced from two to one as well. This will eliminate a dangerous decision point (weave and merge section) that motorists face immediately after turning left onto Bingham Drive. Once the number of receiving lanes is adjusted, the approach lanes on Bingham Drive can be adjusted as well. Currently, there are three lanes – a thru/left and two right turn lanes. By reconfiguring these to a left-turn, a thru, and a right-turn lane, the traffic signal can be reconfigured to remove split phasing and improve overall operations at the intersection. Pedestrian improvements also are recommended at the intersection, including high visibility crosswalks and pedestrian countdown signal heads on the eastern and southern legs of the intersection.

An existing leftover between Bingham Drive and Bunce Road serves a retail business south of Raeford Road. Discussions during the development of recommendations include whether this access point was necessary. After analyzing traffic volumes at both Bingham Drive and Bunce Road, the project team decided to keep this access point to manage left-turning volumes at both intersections.

Revere Street/Time Warner Office Building

No specific geometric improvements are proposed at this intersection, however in response to the crash history at this location, the project team recommends the conversion of left-turn operations along Raeford Road from permitted movements to protected-only movements.

Skibo Road

In terms of both safety and congestion, the Skibo Road and Raeford Road intersection is one of the worst along the corridor. The through movements are among the heaviest observed movements along the entire study corridor. The turning movements are heavy in all directions, with large volumes of both left and right turning traffic from Skibo Road onto Raeford Road and an equally large left-turn movement from Raeford Road onto Skibo Road. The businesses in the vicinity of the intersection essentially now operate with right-in/right-out access given the traffic volumes. Motorists that attempt to turn left into a business create congestion or pose a safety hazard.

In response to these circumstances, an innovative intersection design was created to reduce congestion and improve safety. The design, a Continuous GreenT-intersection, results from discussions between the project team and Advisory Committee. The intersection type allows continuous thru movements in the eastbound direction. To accomplish the free flow condition, the left turn movement from Skibo Road to Raeford Road has to be channelized with monolithic medians to prevent sideswipe conditions. The introduction of this type of intersection has measurable benefits on congestion, including a large reduction in overall delay in the AM peak and a smaller reduction in delay in the PM peak. The reduction in delay is caused by allowing the eastbound through movement to stay green during the southbound turning movements. Because the splits for the other movements remain the same, significant reduction in delay is recognized during the AM peak when the majority of the traffic is coming from the west.

In addition to the **Continuous Green-T** improvements, channelization and free-flow movements for right turns from Raeford Road to Skibo Road are recommended. By channelizing this movement, drivers should be more willing to turn right under free flow conditions and reduce congestion and stacking along Raeford Road.

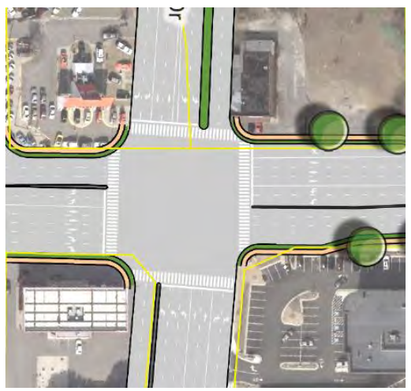


Cindy Drive to Durant Drive

The proposed improvements in this section include leftover access at both Cindy Drive and Durant Drive. These leftovers are proposed as an offset pair, with the access point at Cindy Drive serving the area north of Raeford Road and the access point at Durant Drive serving the area south of Raeford Road. These two locations also will allow u-turns to serve motorists attempting to reach businesses and destinations between Skibo Road and Sandalwood Drive.

Hope Mills Road/Glensford Drive Extension

The improvements at Hope Mills Road and the Glensford Drive extension were taken directly from the NCDOT study on the Glensford Drive extension. It is assumed that these improvements will begin construction in 2012. The specific laneage improvements, including three left turning lanes from Hope Mills Road onto Raeford Road and dual right turn lanes from Raeford Road onto Hope Mills Road, are based on traffic forecasts completed by NCDOT. Prior to construction, the traffic volumes and improvements should be vetted to ensure that this level of design is necessary. This type of widening has the potential to be very disruptive to adjacent businesses and does not support walkability. Moreover, this approach to relieving congestion does not support the vision of the ***Raeford Road Corridor Study***, which seeks to balance safety, mobility, and appearance without compromising economic vitality.



In addition to the laneage and geometric changes at Hope Mills Road and the Glensford Drive extension, the inclusion of high visibility crosswalks and pedestrian countdown signals are recommended. However, these recommendations may not be appropriate at this location given the overall size and number of lanes proposed by NCDOT.

Brighton Road to Scotland Drive

The Brighton Road and Scotland Drive improvements are contingent upon the completion of the Glensford Drive extension. Once the Glensford Drive extension is complete, the additional access point created on Raeford Road should reduce the demand for the signalized intersection at Brighton Road. Once that demand is reduced, the project team recommends the relocation of this signal from Brighton Road to Scotland Drive. This relocation provides a safer access point into Owen Drive, eliminating the need for a physical crossing guard to stop seven lanes of traffic along Raeford Road in the AM and PM school peaks. Additional circulator access may be needed along the periphery of the school site.

An additional collector street is proposed between Scotland Drive and Brighton Road, in the graded area of the former K-Mart. This connection should be established as the site redevelops to allow better access through the site and between the two roadways.

In addition to the relocated signal in this segment, pedestrian improvements are proposed at the Scotland Drive intersection. These improvements include high visibility crosswalks and pedestrian countdown signals.

Ireland Drive

No major geometric or laneage changes are proposed at Ireland Drive, but the pedestrian improvements at the intersection are recommended. These improvements include high visibility crosswalks and pedestrian countdown signals.



Roxie Avenue/Ferncreek Drive

No major geometric or laneage changes proposed at Roxie Avenue/Ferncreek Drive, however pedestrian improvements at the intersection are recommended. These improvements include the high visibility crosswalks and pedestrian countdown signals on the northern, western, and southern legs of the intersection.

All American Expressway

After Skibo Road, the All American Expressway ramps are the second highest point of frustration along the corridor. The congestion between and approaching these ramps results in stacking beyond the adjacent intersections in the peak hour. To mitigate this congestion, a new ramp and interchange configuration was analyzed. The result of this analysis was an additional ramp in the northwest quadrant.

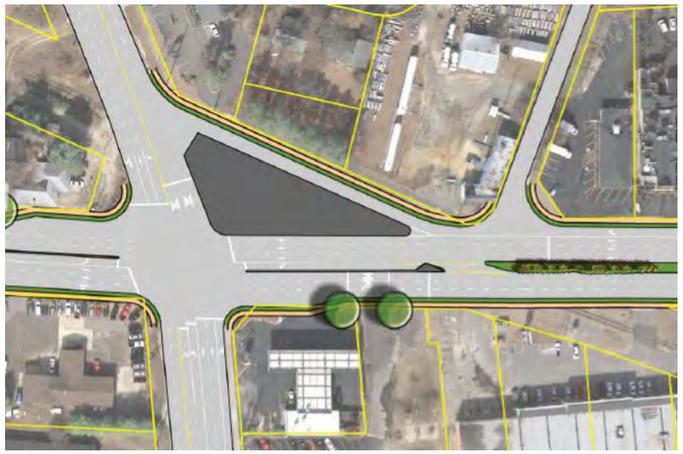
The additional ramp will serve southbound All American Expressway vehicles exiting to westbound Raeford Road. By creating this ramp that serves only right-turning vehicles, a left-turn movement and signal phase can be removed from the existing intersection. The removal of this single phase reduces congestion, delay, and left turn queuing considerably. In addition to the improvements on the north side of Raeford Road, another right-turn lane can be included on the south side to further reduce congestion.

These recommendations should be completed in conjunction with the NCDOT TIP project U-4414 to minimize construction costs.



South McPherson Church Road/Owen Drive

No major geometric, laneage, signalization, or pedestrian improvements at this intersection are recommended. The only modification is the construction of a consistent monolithic median on the westbound approach to close gaps in the existing median. Based on visual observations and comments from the public, this area is a problem as motorists turn in and out of the gas station on the southeast quadrant. Completing the median in this section (with the only gap occurring at the railroad tracks) will alleviate this concern.

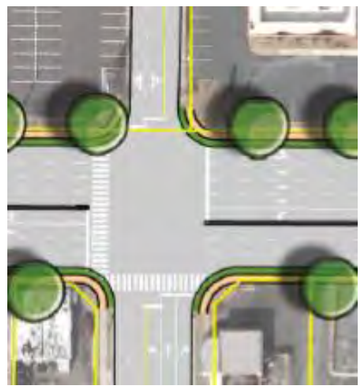


Fairfield Road

No major geometric or laneage changes are proposed at Fairfield Road, however pedestrian improvements are recommended. These improvements include high visibility crosswalks and pedestrian countdown signals on all four approaches.

Purdue Drive

No major geometric or laneage changes are proposed at Purdue Drive, though improvement of existing pedestrian amenities at the intersection is recommended. These improvements include upgrading existing crosswalks to high visibility crosswalks with pedestrian countdown signals on the western and southern legs of the intersection.



Executive Drive

The existing left turn movements (both ingress and egress) at Executive Drive are dangerous and time-consuming. The number of office parks in this area creates distinct queuing patterns at this intersection. During the morning peak hour, traffic queues in the two-way center turn lane along Raeford Road. Buses also are part of the morning commute due to Max Abbott Middle School located north of Executive Drive. During the evening peak hour, traffic queues along Executive Drive to turn left onto Raeford Road.

To relieve congestion and queuing (and related safety problems) a single direction northbound leftover is recommended on Raeford Road. This treatment will allow left and right turns onto Executive Drive and restrict outbound movements to right turns only. Motorists wishing to turn left from Executive Drive on to Raeford Road can use one of two adjacent traffic signals (Purdue Drive or McPhee Drive/Robeson Street) or perform a right turn then u-turn maneuver.

Robeson Street

No major geometric or laneage changes are proposed at Robeson Street, but improvement to existing pedestrian amenities at the intersection are recommended. These improvements include upgrading existing crosswalks to high visibility crosswalks with pedestrian countdown signals on the western and southern legs of the intersection.



Traffic/Operations/Potential Safety Benefits

The preceding recommendations were developed to address problems identified through analysis and discussions with stakeholders and the general public. Each recommendation was selected by the Advisory Committee based on its potential to mitigate congestion issues and reduce the potential for future crashes. With that in mind, the following potential congestion and safety benefits could be derived from these improvements.

In the *Desktop Reference for Crash Reduction Factors* published in September 2007 by the FHWA, crash reduction factors are listed for various roadway and intersection modifications. FHWA predicts that installing a median on an urban multilane highway would reduce injury crashes by 22%. It also predicts a 15% reduction in all crashes. Based on these reduction factors, and the crashes documented during the analysis period, just over $10,000,000 could have been saved during the analysis period with the installation of a median. More important than the monetary savings would be the reduction in fatalities as well as injury crashes.

Table 5.3 shows the LOS and delay for each of the study intersections for the 2020 Build scenario. With the proposed improvements in place, no intersections are projected to operate worse than LOS E. In fact, in only four conditions is LOS E observed:

- AM peak hour at 71st School Road/Graham Road
- PM peak hour at 71st School Road/Graham Road
- AM peak hour at Owen Drive/McPherson Church Road
- PM peak hour at Robeson Street

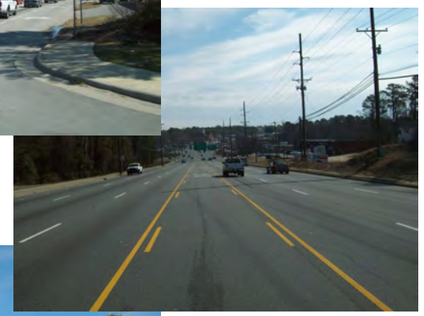
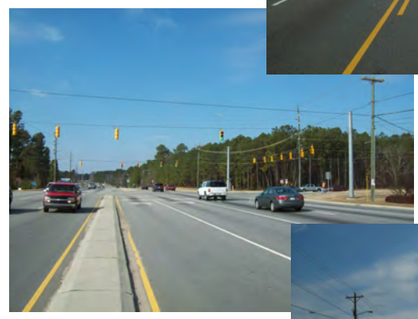
It also should be noted that because of the restriction of left-turns due to the proposed median, the LOS at all unsignalized intersections either remains the same or improves.

Table 5.3 - Raeford Road Intersection Levels of Service and Delays

Intersection	Existing Conditions LOS (Delay)		2035 No-Build LOS (Delay)		2020 Build LOS (Delay)	
	AM	PM	AM	PM	AM	PM
71st School Rd./Graham Rd.	D (53.2)	D (46.4)	F (138.4)	F (143.2)	E (74)	E (57.8)
Strickland Bridge Rd.	B (15.8)	C (25.0)	E (55.4)	C (29.5)	D (47.7)	C (30.5)
Bunce Rd.	D (54.8)	E (56.7)	F (86.6)	F (124.9)	D (44.6)	D (43.9)
Bingham Dr.	B (13.1)	B (17.0)	B (14.6)	B (17.2)	B (14.6)	B (19.1)
Revere St.	A (7.1)	B (16.4)	A (9.4)	C (29.0)	B (18.7)	C (24.3)
Wildwood Dr.	E (35.1)*	D (31.0)*	D (25.3)*	E (44.2)*	C (17.5)	B (11.7)
Skibo Rd.	C (25.8)	C (34.4)	D (36.2)	D (43.8)	B (16.4)	D (37.1)
Sandalwood Dr.	A (7.5)	B (11.3)	A (9.6)	B (13.1)	B (16)	B (11)
Hope Mills Rd.	C (23.7)	C (25.3)	C (26.2)	C (26.8)	D (45.5)	D (41.5)
Brighton Rd.	B (15.6)	C (32.8)	B (16.9)	D (38.3)	B (11.2)	B (13.7)
Scotland Drive	*Not analyzed***				C (21.9)	B (18.7)
Montclair Rd.	A (5.6)	A (5.6)	A (6.1)	A (8.9)	A (8.4)	A (5.2)
Ireland Dr.	C (25.5)	C (29.0)	D (40.5)	D (35.4)	D (38.3)	C (28.4)
Roxie Ave/Ferncreek Dr.	B (18.3)	D (39.2)	D (46.7)	F (80.6)	C (31.4)	C (34.9)
All American Expressway SB Ramp	E (60.4)	C (21.8)	E (78.4)	C (34.7)	B (14.4)	B (18)
All American Expressway NB Ramp	B (12.2)	B (14.2)	B (16.6)	B (15.6)	B (12.1)	B (11.6)
Owen Dr./McPherson Church Rd.	D (37.1)	C (33.4)	D (38.9)	D (36.3)	E (60.8)	D (40.4)
Cambridge St.	A (9.0)*	B (10.3)*	A (9.0)*	B (10.3)*	A (9.1)	B (10.7)
Fairfield Rd.	A (4.8)	B (16.7)	A (5.1)	B (17.6)	B (11.3)	B (15)
Emeline Ave./Marlborough Rd.	F (56.1)*	E (38.8)*	F (69.4)*	E (48.1)*	B (11.1)	B (13.4)
Purdue Dr.	B (10.5)	C (26.8)	B (11.2)	C (28.5)	C (24.5)	D (38.5)
Robeson St.	D (38.5)	D (47.3)	D (45.8)	F (89.4)	D (40.1)	E (73.4)

* = *unsignalized intersection*

** = *no traffic counts available for analysis*



CHAPTER 5 – ACTION PLAN

To fulfill the vision of the ***Raeford Road Corridor Study***, a well-crafted implementation/"Action Plan" is essential. Some of the implementation steps identified in this chapter seek to provide conditions under which the plan vision can be achieved through public and private investments and the development of appropriate programs, policies, projects, and other actions. The intent of this "Action Plan" is two-fold; first, it must provide decision-makers with an implementation blueprint that will enable them to track progress and schedule future year improvements. Second, clearly defined action items will enable the city, NCDOT and FAMPO to identify public and private investment opportunities that are healthy, sustainable, and achievable through well-guided transportation and land use policies that encourage quality design and environmental stewardship.

All indications point to a paradigm shift in the way the Fayetteville region does business. Similar to other communities and areas within the state, the Raeford Road corridor has reached a tipping point, where high levels of traffic congestion, unsafe travel conditions, and non-sustainable development patterns can no longer be tolerated. Local incentives for the development community are not necessarily protocol. Property and business owners have been reluctant to reinvest in the property itself. Today, there is a true demarcation between commercial sprawl into the rural areas and what was once Raeford's thriving commercial core. The quality of private investment in both design and community amenities will have a profound impact on the attractiveness of the area. Successful and sustainable development will come only through a cooperative effort between public and private ventures.

Already, we have seen the public investment in this regional corridor through NCDOT committed funding to projects such as the All American Expressway widening improvements (TIP #U-4414 – to be completed in 2014) and the Glensford Drive Extension (TIP # U-4422 – to be completed in 2012). However, the completion of this study represents an important step toward implementing a long-term vision of quality development, safety, and aesthetic improvements within the study corridor. The structure of the recommendations does not require that all improvements are completed at one time. This should allow flexibility to work in partnership with the development community (i.e., City and FAMPO) as well as NCDOT to implement the vision of the plan in several phases as development occurs and funding sources become available.


Controlling Factors

The implementation of the study recommendations will depend on action being taken to:

- Revise existing City regulations.
- Endorse, through a Memorandum of Understanding (MOU), the concept of design exceptions for specific roadway and access management improvements as identified in this study.
- Undertake more detailed studies to resolve and explore the cost, constraints, and opportunities identified by this study.
- Work with FAMPO to balance the benefits of transportation improvements with the cost, both actual and perceived in terms of community impact. Work with NCDOT to pursue adequate funding to implement projects and programs.
- Work with the development community to implement spot improvements, collector street connections and cross-access improvements.

The implementation steps identified in this chapter will be executed in phases and will be subject to a variety of factors that will determine their timing. These factors include:

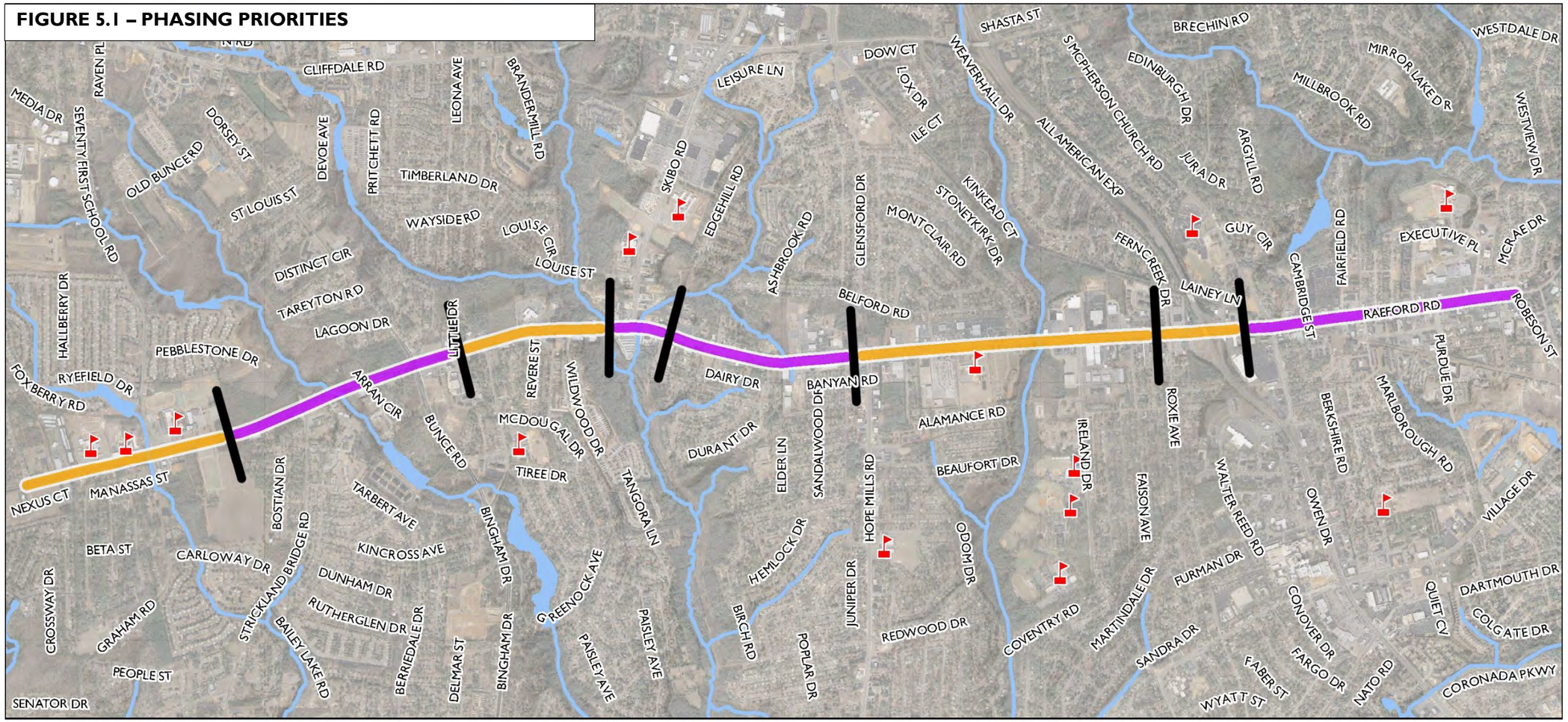
- The degree of control or influence the City/FAMPO has, relative to its desire to implement changes. Specifically, as shown in the Action Plan Matrix (**Tables 5.3 – 5.5**).
- The availability of the personnel and financial resources necessary to implement specific improvements.
- Whether an implementation step is an independent project or program, an incidental part of a larger project, or a component of the rational evaluation of a new development project.
- The interdependence of various implementation items, in particular the degree to which implementing one item is dependent on the successful completion of another item (i.e., cross-access improvements made before the implementation of a median treatment).
- The relative severity of the problem that a particular implementation item is designed to remedy.

With this in mind, the following Action Plan identifies next step items for each category described and summarized in **Chapter 4** – Recommendations of this report. Specific categories include recommendations for General Procedures, Land Use and Policy; Interim & Long-term Transportation (Highway, Bike & Pedestrian, and Transit), and Funding Strategies. Within the context of the land use considerations, specific action items were discussed in **Chapter 2** – Existing Conditions of this report. Ultimately, these recommendations can be administered concurrently or as priorities and regional initiatives present the opportunity to do so.

Note, the phasing priorities plan for the Raeford Road construction improvements are depicted in **Figure 5.1**.



FIGURE 5.1 – PHASING PRIORITIES



Legend

Phasing Priorities

- Interim
- Long-term

0.5 0.25 0 0.5 1 Miles

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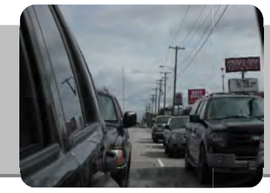


Table 5.1 – Action Plan Matrix – Policy & Regulatory Items

	Cost Estimate[A]	Timeframe[B]	Responsible Party
Adopt the Raeford Road Corridor Study	N/A	2010	FAMPO
Work cooperatively with the City and NCDOT during the next update of their Capital Improvement Program (CIP) and Transportation Improvement program to incorporate the phased recommendations of this study	N/A	2011	FAMPO/ City/ NCDOT
Consider the creation of an access management overlay ordinance. The ordinance will provide a legal framework for the City to administer and enforce consistent access management standards along the corridor as depicted in this study. The ordinance should contain rules and requirements for the "core" components of the Concept Design Plans, including minimum spacing standards for traffic signals, median openings, and driveways; and provisions for corner clearance. The ordinance also should require cross access between adjacent commercial properties, consolidation/elimination of excessive driveways, and retrofitting site access to the side and rear portions of the site	N/A	2011	FAMPO/ City
Continue to require developers to fund roadway improvements that are rational and proportional to the impact created by development	N/A	2011	FAMPO/ City/ NCDOT
Update City ordinances to clarify design guidance for sidewalk, greenways, and multi-use paths	N/A	2012	FAMPO/ City
Consider revising the posted speed limit on Raeford Road between: 1) Hampton Oaks Drive and Hope Mills Road to 45 mph; and 2) Hope Mills Road and Robeson Street to 35 mph	N/A	2012	FAMPO/ City/ NCDOT
Update Subdivision Ordinance to allow reduction in trip generation for trips diverted to alternate modes of transportation, provide incentives, reduce parking requirements, strengthen connectivity, establish sidewalk maintenance policy, and implement traffic calming program	N/A	2013	FAMPO/ City/ NCDOT
Introduce new project selection factors at FAMPO to reinforce the importance of maintaining existing systems through access management and Complete Street applications	N/A	2013	FAMPO/ City/ NCDOT

[A] Cost estimate includes estimated design cost and twenty percent contingency. Probable construction cost estimate is engineer's approximation in current year dollars and is subject to change based on increased construction materials, design, or time of implementation.

[B] Timeframe for implementation is an estimate based on project need and available funding. Actual timeframe may vary based on externalities. All projects and "Action Items" have been vetted through a collaborative process which included the following agencies: FAMPO, NCDOT, and City of Fayetteville



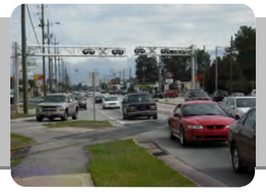
Table 5.2 – Action Plan Matrix – Roadway Items

Interim (2009-2020)	Cost Estimate	Timeframe	Responsible Party
Balance the corridor mobility needs with other priorities such as the function of the street, corridor relationship to land use, urban design, and the promotion of alternate modes	N/A	2011	FAMPO/ City/ NCDOT
Conduct traffic speed studies (Glensford Drive and 71st School Road/Graham Road) to identify potential traffic calming measures	$40,000	2012	FAMPO/ City
Adopt a complete streets policy and use it to ensure all future transportation projects incorporate safe and efficient facilities and services for users of all ages and abilities	N/A	2012	FAMPO/ City
Revise the collector street portion of the FAMPO Long-Range Transportation Plan with alignment and classification changes outlined in **Chapter 4** to provide guidance to development community on proposed street network	N/A	2013	FAMPO
Plan, design, build and maintain landscaped medians along designated sections of Raeford Road (see Concept Design Maps – end of document) that will manage access, improve safety and add to visual attractiveness of the area	N/A	2013	FAMPO/ City/ NCDOT
Aggressively pursue full funding and implementation of the following high priority roadway improvements (plantable median, streetscape, laneage and resurfacing) to Raeford Road. See Conceptual Design Plans (end of document). 1. Hampton Oaks Road to west of Strickland Bridge Road. (Probable Construction Cost ***$2.2 million***) 2. West of Hope Mills Road to west of Roxie Avenue. (Probable Construction Cost ***$2.8 million***) 3. West of Bingham Drive to west of Skibo Road. (Probable Construction Cost ***$1.2 million***) 4. West of Roxie Avenue to west of Owen Drive. (Probable Construction Cost ***$900,000***)	$7.1 million	2012 (initiate)	FAMPO/ City/ NCDOT
Complete the collector street network identified in the Preferred Access Plan (**Figure 4.4**) to provide slower-speed, lower-volume "Complete Streets" suitable for pedestrians and many cyclists	$3.1 million	2012 (initiate)	FAMPO/ City/ NCDOT
Long -Term (2021-2035)	**Cost Estimate**	**Timeframe**	**Responsible Party**
Aggressively pursue full funding and implementation of the following medium priority roadway improvements (plantable median, streetscape, laneage and resurfacing) to Raeford Road. See Conceptual Design Plans (end of document). 1. West of Strickland Bridge Road to west of Bingham Drive. (Probable Construction Cost ***$1.5 million***) 2. West of Skibo Road to east of Skibo Road. (Probable Construction Cost ***$1.4 million***) 3. East of Skibo Road to west of Hope Mills Road. (Probable Construction Cost ***$1.6 million***) 4. West of Owen Drive to Robeson Street. (Probable Construction Cost ***$2.5 million***)	$7.0 million	2021 (initiate)	FAMPO/ City/ NCDOT



Table 5.3 – Action Plan Matrix – Bicycle & Pedestrian Items

	Cost Estimate	Timeframe	Responsible Party
Pursue connectivity for pedestrians and cyclists with pathways in places where street connections are not feasible or acceptable	N/A	2012 (initiate)	FAMPO/ City/ NCDOT
Review land development and redevelopment applications to identify opportunities to connect bikeways, greenways, and sidewalks with adjacent neighborhoods, parks, schools, offices, shops, and public spaces as identified in the Bicycle and Pedestrian Improvements (**Figure 4.1**)	N/A	2012 (initiate)	FAMPO/ City/ NCDOT
Build sidewalks and "high visibility" crosswalks at designated signals (see Concept Design Plans) along the Raeford Road to enhance safety and connectivity to neighborhoods, schools and commercial businesses	$5,000 (per location)	2013	FAMPO/ City/ NCDOT
Enhance crosswalks and pedestrian signals at the following three priority locations: ✓ 71st School Road and Raeford Road ✓ Purdue Drive and Raeford Road ✓ Robeson Street and Raeford Road	$6,000 (per location)	2013	FAMPO/ City/ NCDOT
Use federal and state grants to implement infrastructure-related and non-infrastructure projects and programs associated with walking and bicycling to all public schools located within the Raeford Road study area. This should include: conduct in-school training for fourth-grade students about bike and pedestrian safety, Train the Trainers with adult training in bike and pedestrian safety, and conduct a "Walking School Bus", "Bike Rodeo" or "Bicycle Train" with students	N/A	2014	FAMPO/ City/ Cumberland County Board of Education
Continue to fund sidewalk construction using City and FAMPO funds in accordance with the following priority sections along Raeford Road: ✓ Hampton Oaks Road to east of 71st High School. Both sides of roadway. This section is a priority one section. (Cost ***$173,000***) ✓ West of Bingham Road to west of Skibo Road. South side of roadway. This is a priority one section. (Cost ***$80,000***) ✓ West of Hope Mills Road to west of Roxie Avenue. South side of roadway. This is a priority one section. (Cost ***$140,000***) ✓ West of Roxie Avenue to west of Owen Drive. South side of roadway. This is a priority one section. (Cost ***$22,000***) ✓ East of 71st High School to west of Bingham Road. North side of roadway. This section is a priority two section. (Cost ***$140,000***) ✓ West of Skibo Road to east of Skibo Road. South side of roadway. This is a priority two section. (Cost ***$40,000***) ✓ East of Skibo Road to west of Hope Mills Road. South side of roadway. This is a priority two section. (Cost ***$85,000***) ✓ West of Owen Drive to Robeson Street. South side of roadway. This is a priority two section. (Cost ***$120,000***)	$800,000	2015 (initiate)	FAMPO/ City/ NCDOT
Consider a new Police program to distribute "coupons" to Fayetteville youth for demonstrating responsible bicycling in a "Catch 'em biking right" campaign	N/A	2015	Fayetteville Police Dept.


(Continued)	Cost Estimate	Timeframe	Responsible Party
Install crosswalks and pedestrian signals at the following eight priority locations: ✓ Hope Mills Road and Raeford Road (incidental project to TIP #: U-4422) ✓ Strickland Bridge Road and Raeford Road (incidental project to future extension to Pebblestone Drive) ✓ Bingham Drive and Raeford Road ✓ Skibo Road and Louise Street (*FAST* Transfer Station) ✓ Scotland Drive and Raeford Road ✓ Ireland Drive and Raeford Road ✓ Roxie Avenue and Raeford Road ✓ Fairfield Road and Raeford Road	$10,000 (per location)	2015	FAMPO/ City/ NCDOT
Conduct a feasibility study to evaluate the suitability, relative impacts and costs associated with a proposed greenway along Beaver Creek south of Raeford Road. A ten foot wide multi-use path would provide an additional access to the corridor and allow non-vehicular mobility to and from numerous neighborhood connections in the southern study area. (Study Cost ***$100,000*** – Probable Construction Cost ***$1 million***)	$1.1 million	2016	FAMPO/ City
Implement two parallel bicycle routes along some of the lower volume collector streets adjacent to Raeford Road. Improvement measure may include enhance bicycle route signage and "bucket of paint" striped bike lanes to the following routes: ✓ A southern bicycle route that follows Village Drive, portions of Ireland Drive, Coventry Road, Odom Drive, Watauga Road, and connects to Raeford Road via Scotland Drive (which is proposed to be signalized). (Cost ***$50,000***) ✓ A northern bicycle route that follows the Glensford Drive extension, Louise Street, Timberland Drive, Pritchett Road, a portion of Cliffdale Road, Bunce Road, and 71st School Road. (Cost ***$50,000***)	$100,000	2017	FAMPO/ City

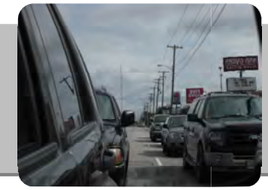
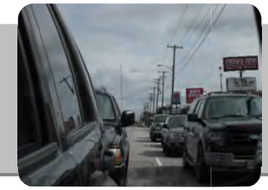


Table 5.4 – Action Plan Matrix – Transit and ITS Items

	Cost Estimate	Timeframe	Responsible Party
Work with FAST to split **Route 15** that currently serves the central and western portions of Raeford Road into two separate routes: ✓ ***Route 15*** *(modified)* – Eastern route that utilizes Ireland Drive to reach the Cape Fear Valley Medical Center ✓ ***Route 18*** – Western route that utilizes 71st School Road, Strickland Bridge Road, and Bingham Drive	N/A	2012	FAMPO/ City/ FAST
Construct bus "pullout" stops along Raeford Road as a part of the corridor construction phasing. The following locations are identified on the Conceptual Design Plans (end of document): ✓ Strickland Bridge Road ✓ Bunce Road ✓ Bingham Drive ✓ Revere Street ✓ Durant Drive ✓ Sandalwood Drive ✓ Hope Mills Road ✓ Scotland Drive ✓ Ireland Drive ✓ Roxie Avenue ✓ Owen Drive ✓ Fairfield Road ✓ Executive Drive ✓ Robeson Street	N/A	2012 (initiate)	FAMPO/ City/ NCDOT
Conduct a public outreach campaign to market and educate the transit-user public of the route and schedule changes within the Raeford Road study area	$10,000	2013	FAST
Provide route maps with departure/arrival times	N/A	2014	FAST
Develop a corporate outreach program to encourage transit use along the Raeford Road corridor	N/A	2015	FAMPO/ FAST
Install bus shelters and improve passenger safety at the following designated bus "pullout" stops along Raeford Road as identified on the Conceptual Design Plans (end of document): ✓ Bunce Road ✓ Hope Mills Road ✓ Ireland Drive ✓ Fairfield Road ✓ Robeson Street	N/A	2015	FAMPO/ City/ FAST
Implement a transfer station at Skibo Road and Louise Street to accommodate passenger movement between Routes 15 and 18. The transfer station should include bus stop shelters and seating, a pedestrian crosswalk with signal, and bus pull-outs for bus loading and unloading	$20,000	2016	FAMPO/ City/ FAST
Upgrade existing Intelligent Transportation System infrastructure commonly referred to as Advanced Traveler Warning System: ✓ Install two new closed circuit television (CCTV) cameras at the Raeford Road intersections of Bunce Road and Robeson Street (Cost ***$20,000*** per camera) ✓ Install three new dynamic message signs, including one on the northbound Robeson Street approach to Raeford Road, one on the westbound Raeford Road approach near Robeson Street, and one on the eastbound Raeford Road approach near 71st School Road (Cost ***$75,000*** per DMS)	$265,000	2019	FAMPO/ City/ NCDOT



Table 5.5 – Action Plan Matrix – Funding Items	
	Responsible Party
Lobby NCDOT and members of the State Board of Transportation (BOT) to include partial funding of the design and implementation of recommended improvements in the next Transportation Improvement Program (TIP).	FAMPO/ City/ NCDOT
Leverage NCDOT District funding allocations for "spot safety" improvement monies to implement safety improvements at key intersections along the Raeford Road corridor. See **Chapter 4** Recommendations for intersection priority list.	FAMPO/ City/ NCDOT
Solicit NCDOT Division Hazard Elimination, Governor's Highway Safety Program (GHSP), Small Construction and Contingency funds improvement monies to implement corridor access and safety improvements at key intersections and segments along the Raeford Road corridor.	FAMPO/ City/ NCDOT
Pursue Enhancement Grants to construct bike, pedestrian and streetscape improvements as outlined in **Chapter 4** Recommendations. State and federal grants can play an important role in implementing strategic elements of the transportation network. Several grants have multiple applications, including Transportation Enhancement Grants as well as State and Federal Transit Grants. The Enhancement Grant program, established by Congress in 1991 through the Intermodal Surface Transportation Efficiency Act (ISTEA), ensures the implementation of projects not typically associated with the road-building mindset. While the construction of roads is not the intent of the grant, the construction of bicycle and pedestrian facilities is one of many enhancements that the grant targets and could play an important role in enhancing the pedestrian safety and connectivity along the Raeford Road corridor.	FAMPO/ City
Aggressively pursue Safe Routes to School (SRTS) funding to enhance bicycle and pedestrian improvements in proximity to the public schools along the Raeford Road corridor. SRTS is a program receiving federal funding through the newest SAFETEA-LU legislation. The program provides funding for individual schools to create route plans or develop facilities that create a safer walking and biking environment for their students. North Carolina has a yearly application program for which any school, school district, municipality or other governmental body, or non-profit association may apply. For more information, visit www.saferoutesinfo.org/. Projects funded through the SRTS program receive 100% federal funding.	FAMPO/ City/ County Board of Education
Consider passing a Transportation Bond referendum to potentially fund the Raeford Road recommendations. Projects that historically have been funded through transportation bonds include sidewalks, road extensions, new road construction, and streetscape enhancements.	FAMPO/ City
Aggressively pursue Recreational Trails Program to construct the Beaver Creek greenway in accordance with this Study. According to the FHWA, "the Recreational Trails Program (RTP) provides funds to the States to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. The RTP is an assistance program of the Department of Transportation's Federal Highway Administration (FHWA). Federal transportation funds benefit recreation including hiking, bicycling, in-line skating, equestrian use, cross-country skiing, snowmobiling, off-road motorcycling, all-terrain vehicle riding, four-wheel driving, or using other off-road motorized vehicles."	FAMPO/ City



The City Council and County Board of Commissioners, in partnership with the Fayetteville Area MPO, should explore the feasibility of implementing one or more of the preferred funding strategies (Table 5.5) identified by the community planning participants. Initial considerations for implementing the various funding strategies should include:

- The feasibility of implementing the specific funding strategy in the City of Fayetteville, including required state authority, regulatory limitations, or political feasibility.
- The extent of the political jurisdiction that would be subject to the provisions of the new funding strategy (e.g., study area or county-wide).
- The amount of revenue that can be generated from the funding strategy.
- The level of local funding match that may be required.
- A list of eligible projects or planning initiatives that could be implemented with the funding source.

Conclusion

There are a variety of funding strategies to implement the recommended improvements for the ***Raeford Road Corridor Study***. These funding strategies include state and local monies, which are often limited or committed well into the future. Grant funding from the state or federal government typically requires a local match, but these monies may be used to cover many of the capital and operating expenses identified in the recommendations for the corridor. Some of the improvements will be made in partnership with the private sector.

An incremental funding approach would be possible, but is not as attractive because the full benefit of the collective improvements would not be realized for quite some time. Alternative funding sources for expediting construction include special assessments and/or a locally-adopted sales tax or tax incentives.

Through the development of this strategic corridor planning initiative, several key stakeholders were collaborated with to establish our guiding principles for the ***Raeford Road Corridor Study***. Property owners, elected officials, business owners and civic leaders came together to establish a corridor vision – "*To create a Plan that enhances the safety, mobility, and appearance of the Raeford Road corridor, in a manner that promotes quality development and economic vitality*". It is here that this collective vision will move forward only through the efforts of those engaged with the planning process or "champions" of the Study. In collaboration with state and local officials, their collective efforts will lead to a safe, multimodal corridor that supports sustainable development opportunities through the heart of Fayetteville's commercial gateway.